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The Advisor



The first thing you may notice about this new catalog is how large it is. The reason for its expanded size is simple. The new Ferraz Shawmut is a much bigger company offering you a much larger range of products. In fact, we like to think of ourselves as the global resource for all of your circuit protection needs. Whether it's a general purpose fuse, a semiconductor protection fuse, a disconnect switch, a medium voltage fuse, or a thermal management product, Ferraz Shawmut is clearly the company where the world turns to for circuit protection solutions.

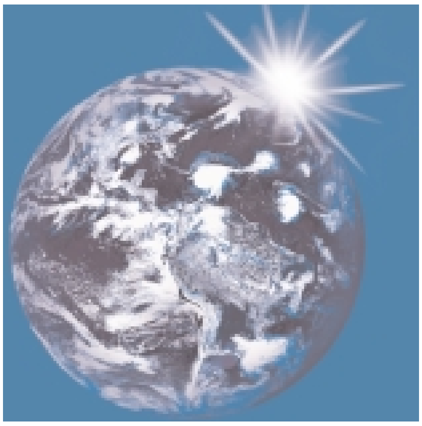
The second thing you may notice is that our catalog has a new name, "The Advisor". In the increasingly complex world of circuit protection, you need more than a comprehensive selection of well engineered products. You need advice on choosing the right fuse for the application. On complying with international fusing standards. And on a whole range of circuit protection questions.





"The Advisor" also represents a team of circuit protection experts dedicated to your field. Nowadays, you don't have time to educate your fuse supplier on the products or the application that requires protection. So, we have assembled a team of experts who have extensive experience in product-specific disciplines. They know about your equipment, your protection requirements and the solutions you need to solve your problems. Supported by an array of proprietary Ferraz Shawmut software, our experts are ready to help you on your most complex requirements.

We offer global solutions wherever you are. Ferraz Shawmut's expertise extends out to you, our customers, wherever you are located and wherever you are doing business. Through our local Ferraz Shawmut sales teams, our Carbone Lorraine subsidiaries, or through one of our distributor partners, we can offer you the advice and assistance you require anywhere in the world. Please see the inside back cover of this "Advisor" for a listing of our main sales offices and worldwide locations. It's just more proof that we will go to the the ends of the earth to show you where the world turns for circuit protection solutions.
For more information, please visit our website at :
http://www.ferrazshawmut.com



General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000®



Class J - Time Delay

1 to 600A

600V AC

UL Listed - CSA Certified

200kA I.R. - Current Limiting

Motor, motor controller, control transformer, and circuit back-up protection. Space saving dimensions. Very current limiting.

AMP-TRAP 2000®



Class L - Time Delay

601 to 6000A

600V AC, 500V DC

4 Second Delay

UL Listed

200kA I.R., 600V AC

100kA I.R., 500V DC

The most current-limiting Class L fuse available today. For increased protection of AC and DC equipment.

AMP-TRAP 2000®



Class RK1 - Time Delay

1/10 à 600A

250 AC or 600V AC

UL Listed - CSA Certified

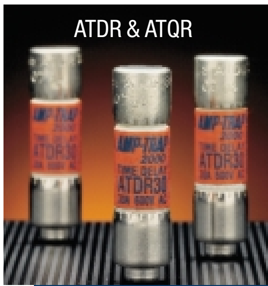
200kA I.R.

Current Limiting

Motor controller and motor overcurrent protection.

Very current limiting.

AMP-TRAP 2000®



Class CC - Time Delay

1-1/2” x 13/32’ (10.3x38)’

UL Listed - CSA Certified

200kA I.R.

ATDR - 1/4 to 30A

For motor protection

ATQR - 1/10 to 30A

For transformer protection

TRI-ONIC®



Class RK5 Time Delay

1/10 to 600A

250V AC or 600V AC

UL Listed

CSA Certified

DC Rated

200kA I.R.

Motor overcurrent, motor controller and transformer protection.

AMP-TRAP®



Class J Fast Acting

1 to 600A - 600V AC

UL Listed - CSA Certified

200kA I.R.

Current Limiting

Feeder circuit, panelboard, and circuit breaker back-up protection. Space saving dimensions. Very current limiting.

AMP-TRAP®



Class L

601 to 6000A

600V AC

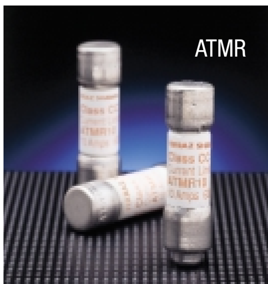
4 Second Delay

UL Listed - CSA Certified

200kA I.R. - Current Limiting

Service entrance, feeder circuit, transformer, and circuit breaker back-up protection.

AMP-TRAP®



Class CC

1-1/2” x 13/32’ (10.3x38)’

1/10 to 30A

600V AC

UL Listed

CSA Certified

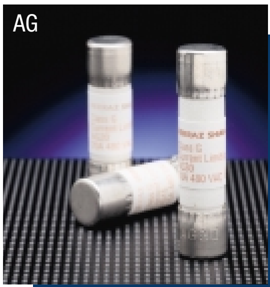
200kA I.R.

Current Limiting

The smallest dimension fuse suitable for branch circuit protection.

General Purpose Fuses

AMP-TRAP®



Class G
1/2 to 60A
480V AC
100kA I.R.
UL Listed - CSA Certified
Current Limiting
With time delay (above 5A) and 480 V rating, AG fits a wider variety of branch circuit protection to lighting, heating and appliances.

AMP-TRAP®



Class T Fast Acting
1 to 1200A, 300V - A3T
1 to 800A, 600V - A6T
UL Listed - CSA Certified
200kA I.R.
Current Limiting
Loadcenter, metering center, panelboard, and circuit breaker back-up protection.
Very current limiting.
Small physical size.

AMP-TRAP®

Class RK1 - Fast Acting
1 to 600A
250V AC or 600V AC
UL Listed
CSA Certified
200kA I.R.
Current Limiting
Feeder circuit, panelboard, and circuit breaker back-up protection.
Very current limiting.



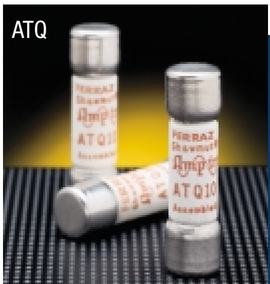
ONE-TIME

Class K5 - General Purpose
1 to 600A
250V AC or 600V AC
UL Listed
CSA Certified
50kA I.R.
Energy Limiting
Lower cost protection for circuits serving heating, lighting, and other non-motor loads.



Midget Fuses for supplementary overcurrent protection

AMP-TRAP®



Midget Dimensions

1-1/2” x 13/32” (10.3x38)

ATQ Time Delay
1/10 to 60 A
500V AC
Lighting, solenoid, motors, transformers, control circuits

AMP-TRAP®



Midget Dimensions

1-1/2” x 13/32”(10.3x38)

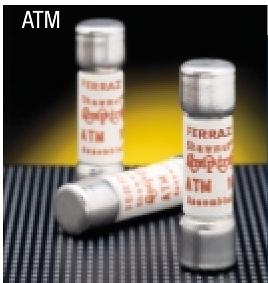
TRM Time Delay
1 to 30A
250V AC
Lighting, solenoid, motors, transformers, control circuits

AMP-TRAP®

Midget Dimensions
1-1/2” x 13/32’ (10.3x38)’

ATM Fast Acting
1/10 to 50A
600V AC, 500V DC

Lighting, heating, control circuits.
Circuits where time delay is not required



MIDGET FUSES

Midget Dimensions
1-1/2” x 13/32” (10.3x38)
OTM Fast Acting
1 to 30A, 250V AC
GGU Fast Acting
(Glass/Ceramic body)
3 to 30A, 125V AC
6JX Fast Acting
1/10 to 30A, 600V AC
Lighting, heating, control circuits.
Circuits where time delay is not required



General Purpose Fuses

SBS



General Purpose
1-3/8” x 13/32” (10.3x35)
2/10 to 30A
600V AC
100kA I.R.
UL Listed
CSA Certified
SBS is the only fuse in its size to have a full 600V AC rating.
Control circuits, lightinh ballasts, motor circuits, electronic circuits

PC MOUNT FUSES



Direct Mount PC Board Fuses
PCF Fast Acting
1 to 30A, 600V AC, 500V DC
PCS Semiconductor Protection Fuses
5 to 30A, 600V AC/DC
Main frame power board, circuit breakers, components
PCT Time Delay Fuses 1 to 30A, 500V AC
UL Recognized Components
Main frame power board, circuit breakers, components

French Ferrule

gG

8x31 - 10x38 - 14x51 - 22x58mm
0.5 to 125A
400V AC (8x32),
400 to 500V AC (10x38)
500 to 690V AC (14x51 - 22x58)
Up to 120kA I.R.
EN 60269-2-1 Compliance
Blown Fuse indicator
Striker (14x51 - 22x58)
Protection of distribution circuits.



aM

8x31 - 10x38 - 14x51 - 22x58mm
1 to 125A
400V AC (8x32), 400 to 500V AC (10x38)
500 to 690V AC (14x51 - 22x58)
Up to 120kA I.R.
EN 60269-2-1 Compliance
Blown Fuse indicator
Striker (14x51 - 22x58)
Motor protection.



NH Fuses

gG



Fuse-links, 00C (000), 00, 0,1, 2, 3,4, 4A sizes
2 to 1250A
400, 500, 690V AC
IEC/EN 60269-2-1 Compliance
Blown fuse indicator
French striker as per IEC/EN 60269-2-1 for dimensions 0, 1, 2, 3 (32 to 630A)
Protection of distribution circuits.
Isolated fuse available up to size 3

aM



Fuse-links, 00, 0,1, 2, 3, 4 sizes
2 to 1250A
500 and 690V AC
IEC/EN 60269-2-1 Compliance
Blown fuse indicator
French striker as per IEC/EN 60269-2-1 for dimensions
0, 1, 2, 3 (32 to 630A)
Motor protection.
Isolated fuse available up to size 3

DIN Fuses

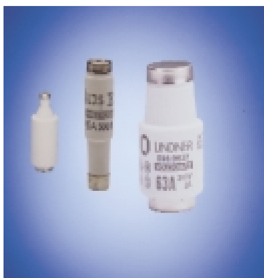
NEOZED (DO)

Fuse-links
Sizes D01, D02, D03
2 to 100A (D01 2-16A, D02 20-63A, D03 80-100A)
400-440VAC, 250V DC
gG, gR, aM - 50kA I.R.
IEC/EN 60269-3-1 Compliance
General purpose cable and line protection and back-up switchgear controlgear protection



D-TYPE FUSES

Fuse-links
Sizes NDZ, D II, D III, D IV, D V
2 to 200A (NDZ 2-25A, D II 2-25A, D III 35-63A, D IV 80-100A, D V 125-200A)
500-690V AC, 500-600V DC
gG, gR - 50kA I.R.
IEC/EN 60269-3-1 Compliance
General purpose cable and line protection



Miniature Fuses

UL Fuses

GLASS BODY

5x20, 6x32mm Dimensions
5MF 5x20 Fast Acting
0.08 to 8A, 250V AC

5TT 5x20 Super Time Lag
0.08 to 5A, 125-250V AC

3AG 6x32 Fast Acting
0.1 to 15A, 125-250V AC

3SB 6x32 Super Time Lag
0.1 to 15A, 125-250V AC



CERAMIC BODY

5x20, 6x32mm Dimensions
5TT 5x20 Super Time Lag
6 to 10A, 125V AC

SU 5x20 Time Lag
1.25 to 12.5A, 250V AC

3AB 6x32 Fast Acting
0.1 to 15A, 250V AC

IEC Fuses

Low interrupting Rating

5x20, 6x32mm Dimensions
EN 60127 compliance

5SF/FI 5x20 Fast Acting
0.032 to 20A, 250V AC

5ST/TI 5x20 Time Lag
0.032 to 20A, 250V AC

3SF/FI 6x32 Fast Acting
0.05 to 20A, 60-250V AC

TI 6x32 Time Lag
1/20 to 20A, 250V AC



High Interrupting Rating

5x20mm Dimensions
EN 60127 compliance

5HF/FISP 5x20 Fast Acting
1/20 to 10A, 250V AC

5HT/TISP 5x20 Time Lag
1/10 to 10A, 250V AC
Approvals : Semko - VDE - UR - CSA.

Ferraz Shawmut specialty
Very high interrupting rating fuses : up to 200 kA

PROTISTOR®5 X 20 mm

FC Fast Acting
0.16 to 10A, 250V AC

FA/FB Very Fast Acting
0.04 to 20A, 125-250V AC

SA/SB Medium Time Lag
0.04 to 16A, 125-250V AC

All kinds of protection
Safety of people and material



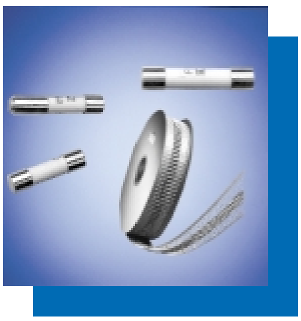
SA Medium Time Lag
0.04 to 3.15A, 380V AC

FA Very Fast Acting
0.04 to 4A, 380V AC

PROTISTOR® 6 X 32 and 6x46 mm

6x32
FA
1/10 to 30A, 125-250V AC
SA Medium Time Lag - 1/10 to 30A, 125-250V AC
FA/FB Fast Acting - 1/10 to 16A, 380V AC
SA Medium Time Lag - 1/10 to 10A, 380V AC
SA Medium Time Lag - 1/10 to 10A, 500V AC
FA Very Fast Acting - 1/10 to 2A, 660V AC

6x46
FA Fast Acting 0.1 to 1A, 1000V AC



AXIAL LEADS REELED TAPE FUSES

5x20, 6x32mm, 6x46 mm dimensions with axial leads

FC 5x20 AL Fast Acting - 0.16 to 10A, 250V AC
FA/FB 5x20 AL Very Fast Acting - 0.04 to 6.3A, 250V AC
FA 6x32 AL Very Fast Acting - 1/10 to 6.3A, 250V AC
SA 6x32 AL Medium Time Lag - 1/10 to 6.3A, 250V AC
FA 6x32 Very Fast Acting - 1/10 to 6.3A, 380V AC
FA 6x32 Very Fast Acting - 1/10 to 6.3A, 500V AC
FA 6x32 Very Fast Acting - 1/10 to 2A, 660V AC
FA 6x46 Fast Acting 0.1 to 1A, 1000V AC

Semiconductor Fuses

North American Fuses

AMP-TRAP® FORM 101



Semiconductor Protection

1/2 to 6000 A

130 V to 1200V AC

Many are UL Recognized Components

Current Limiting

Extremely fast acting. Low I²t provides protection for semiconductors and power electronic equipment.

AMERICAN STANDARD PSC PROTISTOR®



Semiconductor Protection

50 to 6000A

400 to 1350V AC

Many are UL Recognized Components

UNC Stud Style &

American Blade Style

Extremely fast acting. Very current limiting fuses. Low peak let-thru and I²t.

European Fuses

FRENCH STANDARD PSC PROTISTOR®

Semiconductor Protection

50 to 10000A

150 to 1350V AC

Many are UL Recognized Components

ISO Stud Style & French Blade Style Extremely fast acting.

Very current limiting fuses.

Low peak let-thru and I²t.



GERMAN STANDARD PSC PROTISTOR®

Semiconductor Protection

50 to 1250A

660 to 3500V AC - aR & gR operations

Many are UL Recognized Components

Solid Blade Style (DIN 43620)

& Notched Blade Style (DIN 43653)

Extremely fast acting. Very current limiting fuses. Low peak let-thru and I²t.



FRENCH FERRULE PROTISTOR®



Semiconductor Protection

10x38, 14x51, 22x58, 27x60mm

1/10 to 250A

500-1000V AC

Many are Recognized Components

aR & gR operations

Stricker available for each size

Extremely fast acting. Very current limiting fuses. Low peak let-thru and I²t.

DIN PROTISTOR® FUSES



Semiconductor Protection

17x49, 00, 000 (PSC)

12 to 450A

450-690V AC

Many are Recognized Components

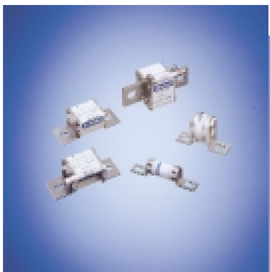
aR & gR operations

Bracket Style & Solid Blade Style

DIN 43653 (00C, 00)

Extremely fast acting. Very current limiting fuses. Low peak let-thru and I²t.

BS88 PROTISTOR® FUSES



Semiconductor Protection

5 to 1050A

250-690V AC

aR & gR operations

BS 88-4 Bracket Style Cylindrical Fuses

& PSC000 Fuses

With or without separated striker.

Many are Recognized Components

Extremely fast acting. Very current limiting fuses. Low peak let-thru and I²t.

DC PROTISTOR® FUSES

DC & Semiconductor Protection

Sizes: 70, 72, 120 to 123, 300, 302, 600, 602.

6 to 1500A

660-4200V DC

aR & gR operations

Very high interrupting rating.

DC characterization.



DC & Semiconductor Protection

14x51, 22x58, 27x60, 20x127mm

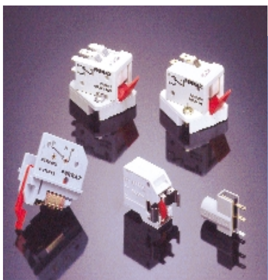
0.8 to 500A

48-4000V DC

Very high interrupting rating.

DC characterization.

MICROSWITCHES



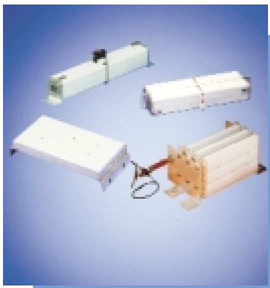
For remote blown fuse indication

For square-bodied PSC and German Standard PSC00 & 000.

Models with separated - stricker fof British Standard Fuses (BS88).

Semiconductor Fuses

Ferraz Shawmut specialty
High voltage semi conductor fuses



CV3 Protistor®

1200 to 4000 VDC

6 to 800 A

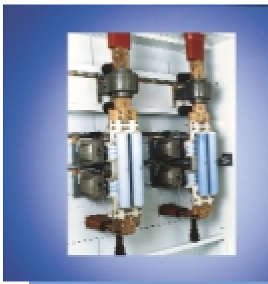
"g" and "a" operating for DC circuits

CV4 Protistor®

5 to 10 kVAC

100 to 1000 A

Very limiting medium voltage fuses
for SC equipment protection



Pyristor®

Complements large size semiconductor fuses

Medium Voltage Fuses

North American Fuses

AMP-TRAP®



E Rated

Current Limiting

5 E to 900E
5.5kV and 15.5kV

UL Listed

Protection for medium voltage
transformers

AMP-TRAP®



E Rated

For Potential Transformers

Current Limiting
1/2E to 5E
2.4, 4.8, 5.0 and 7.2kV
50kA I.R.

Primary protection for potential
transformers.

AMP-TRAP®

R Rated

Current Limiting
2R to 36R
2.4, 4.8 and 7.2kV

Short-circuit protection for
medium voltage motors and controllers.



PT FUSES

Potential Transformer Protection

5.5kV to 25.5kV
Complying with IEC 282-1

Indoor use
Primary protection
for potential transformers.



CAPACITOR FUSES



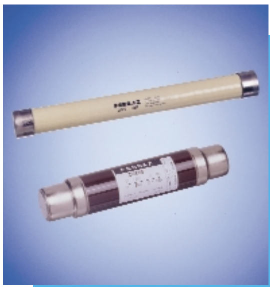
600-4000V AC - 25 to 250A - Full range operation

Prevent rupture of failed capacitor - Blade, stud, end-contact designs.

Medium Voltage Fuses

European Products

UTE AND DIN FUSES



Protection of Medium Voltage Distribution

UTE range : 55x520 mm
6.3 to 100A / 7.2-36kV
Complying with IEC 282-1,
NF C64200 & 64210

DIN range : 6.3 to 200A / 7.2-36kV
Complying with IEC 282-1
DIN 43625

FAULT DETECTORS



Medium Voltage Surveillance Systems

Directionnal fault current indicators
for 1 or 3 phases overhead distribution lines
at voltages from 6 to 132 kV

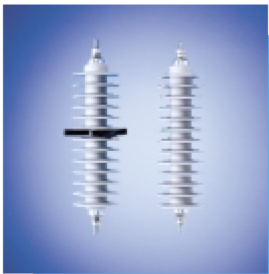
Complete systems for indication of
earth-fault and short-circuit faults in
an underground 6 to 36 kV cable network.

LIGHTNING ARRESTERS

Protection of Medium Voltage Distribution

& MV/LV Transformer
AZX Standard Line
5kA & 10kA Classes
4-36kV

Custom-designed for Utilities
Polymer-housed and zinc oxide-based.



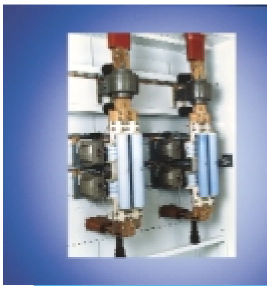
FERRAZ SHAWMUT SPECIALTY : PYRISTOR

Very High Interrupting Speed

1 to 4.5kA
2.5 to 20kV

Protection of installations requiring very low peak let-thru currents.

Protection of existing installations when upgrading without replacement of former protection devices.
Protection of very large specific converters



Special Purpose Fuses

North American

AMP-TRAP®



Welder Protectors

100 to 600A

600V AC

200kA I.R.

Current Limiting

Short circuit protection for electric welders.

Class K and class J dimensions.

AMP-TRAP®



Cable Protectors

600V AC

For sizes #2AWG to 750kcmil

200kA I.R.

Current Limiting

Protect runs of multiple conductor cables by selectively isolating faulted cables. Available for copper and aluminium cable.

Special Purpose Fuses

AMP-TRAP®



Form 600

1 to 600A

250V AC or DC

600V DC AC or 500 V DC

650-1200A 600V AC 200kA I.R.

Energy Limiting

Special purpose fuses for AC and DC applications.

DC switchboard for ships.

SURGE SUPPRESSION FUSES



MOV Protection

- **VSP Range UL recognized**

Sizes: 13/31x1-1/2 and 13/16x2-1/4 with or without tags

600V AC - 200 kA I.R. - Surge Rating 5-100kA

Meet UL 1449 Second Edition requirements

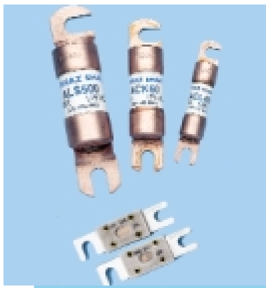
Various mounting configurations.

- **European Range**

Sizes: 5x20, 6x32, 14x51 and 22x58

250-600V AC - Up to 300 kA I.R.

FORKLIFT FUSES



Isolator fuses

For DC battery operated systems

Time Delay (ACK) & General Purpose Fuses (ACL, ALS)

Link visible through window

for CNL, CNN

AC & DC rated

1 to 800A

32-125V AC

TELECOMMUNICATION FUSES

Equipment Protection

70 series 125V AC,

300V DC - 1/10 to 10A

GMS - 125V AC/DC

0.18 to 15A

TGL - 70 to 800A

170V DC - 100kA I.R.

TGN - 1 to 600A

170V DC - 100kA I.R.

TGS -1 to 70A

170 V DC - 100kA I.R.



RESIDENTIAL FUSES

gF

Service entrance panelboard protection

Sizes : 6x23, 8x23, 10x25, 8x31, 10x31, 8x36, 10x38 mm

2-32A - 400V AC

AD

Protection in series with circuit breaker

Sizes: 10x38, 14x51, 22x58, 00

15-90A - 400V AC



FERRAZ SHAWMUT SPECIALTY: ROTATING FUSES



C1G

300 to 1000V

300 to 950A.

For turbo generator excitor

Acceleration: up to 6000g

Worldwide mechanical adaptation

Fuse Blocks & Fuse Holders

North American Power Fuses

ULTRASAFE™ J



US3J & US6J
Modular Holders
600V AC,
30 & 60A Class J
UL Listed
Meet the requierement of UL512
Finger Safe
Optional Indicating Lights
DIN Rail Mount
Compact footprint
Quick, easy fuse change.

CYLINDRICAL & BLADE FUSE BLOCKS



Class H, K
& R Fuse Blocks
Class J Fuse Blocks
Space-saving
"SJ" Fuse Blocks
250V & 600V AC
for H, K & R
600V AC
for Class J Fuse
25% less mounting space for
"SJ" Fuse Blocks.

FORM 101 FUSE BLOCKS



For Form
101 fuses
1 to 600A
1000V AC
for stud type
1200V AC
for clip type
UL recognized

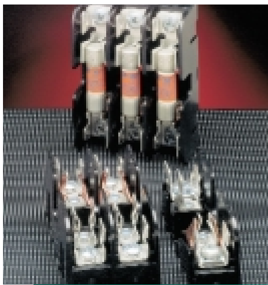
Midget Fuses

ULTRASAFE™ HOLDERS



USCC & USM Modular Holders
600V AC, 30A
UL Listed
Meet requirements of UL512
Finger Safe
Optional Indicating Lights
DIN Rail Mount
Compact Footprint
Quick, Easy Fuse Change

MIDGET & CLASS CC FUSE BLOCKS



For Midget & Class CC Fuses
600V AC, 30A
Withstand rating:
200kA using screw, pressure plate
10kA using quick connects
UL Listed for CC and UL Recognized for Midget
Meet requirements of UL512
CSA Certified

IN-LINE FUSEHOLDERS

For 1-1/2"x13/32" fuses
Rated 30A, 600V AC
Withstand Rating: 200kA
Breakaway Feature - Standard
UL Recognized
CSA Certified
Choice of crimp or screw connectors for solid or stranded copper cable.
Rubber boots available.



GPM PANEL MOUNT FUSEHOLDERS

Various sizes accommodate 5x20 mm

1/4" x 1 1/4" or 1 - 1/2" x 13/32"

Midget and Class CC Fuses.

Front or rear mounting in panel.

UL Recognized

CSA Certified



French Ferrule Fuses

SI MODULAR BASES



For 14X21, 22X58 mm Fuses

750V AC, 63 & 135A

Base Mount with optional microswitch and partition

IEC 269-2-1 Compliance.

CMS MODULAR FUSEHOLDERS



For 10x38, 14x51 and 22x58 mm fuses

690V AC

DIN-Rail Mount with possible padlocking

Blown fuse indication or striker
IP20 Protection

IEC 269-2-1 Compliance.

Fuse Blocks & Fuse Holders

ST MODULAR FUSE-DISCONNECTORS



For 8x32, 10x38, 14x51 and 22x58 mm fuses

480-690V AC, up to 125A - DIN-Rail Mount

Blown fuse indication and preisolating microswitches

IP2X Protection - IEC/EN 60947-3 Compliance.

NH Fuses

THERMOPLASTIC BASES

00 to 3 NH Fuses Bases

690V AC

440V DC

1-pole, 3-pole

IP20 protection with accessories

IEC/EN 60269-2-1 Compliance.



CERAMIC BASES

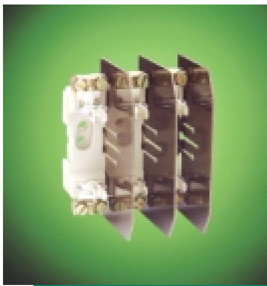
Size 00 to 4 NH Fuse Bases

690V AC

440V DC

1-pole, 3-pole

IEC/EN 60269-2-1 Compliance.



NH-00 LINOCUR FUSE SWITCH-DISCONNECTOR



690V AC 100A

500V AC 125 A

On-load operation

1-pole, 3-poles

IEC/EN 60947-3 Compliance.

FUSE SWITCH-DISCONNECTORS



BS, GI & SM Series

For 00 to 4 NH Fuse-links

690V AC, up to 1250A

On-load operation

3 poles

IEC/EN 60947-3 Compliance

DIN Fuses

BASES AND ACCESSORIES

For D and Neozed (D0) fuses

D System: 500V AC & 690V AC

500V DC, up to 63A

1-pole, 3-pole bases

Neozed(D0) System: 400V AC , 440V AC, 250V DC, up to 100A

1-pole, 3-pole bases

IEC/EN 60269-3-1 Compliance



D0 LINOCUR FUSE SWITCH-DISCONNECTORS

For D01 & D02 NEOZED Fuse-links

On-load operation

1, 1+N, 2, 3, 3+N-poles.

D01 : 400V/16A

D02: 400V, 440V/63A

IEC/EN 60947-3 Compliance



Fuse Blocks & Fuse Holders

NEOKIT FUSE SWITCH-DISCONNECTORS



For Neozed fuse-links

400V, 16A

On-load operation

1, 2, 3 poles

SEMICONDUCTOR FUSE BASES



For DIN Standard

Semiconductor Fuses

Designed

for DIN 43653

Blade-Style Fuses.

Miniature Fuses

IN-LINE FUSEHOLDERS

For 1-1/2" x 13/32" fuses

Rated 30A, 600V AC

Withstand Rating : 200kA

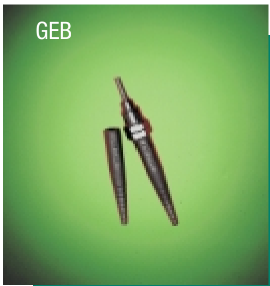
Breakaway Feature - Standard

UL Recognized - CSA Certified

Choice of crimp or screw connectors

for solid or stranded copper cable.

Rubber boots available.



SINGLE-POLE FUSE BLOCKS

5X20QC1

For 5x20 mm Fuses

Rated 15A, 250V AC

UL Recognized

6x32QC1

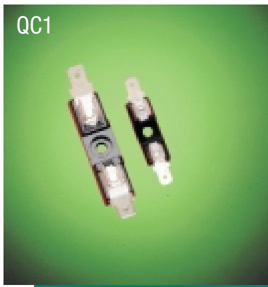
For 1/4" x 1-1/4" Fuses

Rated 30A, 250V AC

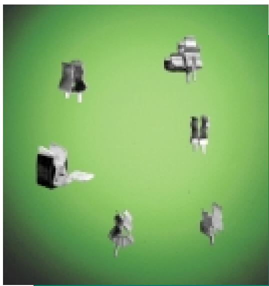
UL Recognized

Rated 20A, 250V AC

CSA Certified.



CLIPS



For ferrule

style fuses

5, 6.3

and 10.3 mm

diameter.

DEAD-FRONT FUSE COVERS

Snap on to Class G, H, J, K, R, CC

or Midget Fuses in Fuse Holders

Provide Dead Front

Electrical Safety

Reusable Optional Open

Fuse Indicator Light

UL Listed or Recognized

CSA Certified.



PANEL MOUNT FUSEHOLDERS



Various sizes

accommodate 5x20mm

1/4" x 1 1/4" or

1 - 1/2" x 13/32"

Midget and

Class CC Fuses.

Front or rear

mounting in panel.

UL Recognized

CSA Certified.

Medium Voltage Fuses

BASES

For Ferrule-style fuses

Up to 36 kV



CLIPS

For Ferrule-style fuses

20.6, 36, 45, 55 mm diameter.



Power Distribution Blocks

MINI



Single and Multi-Pole
For Cu or Al cables
600V AC - Ratings 95 to 240A
Provides convenient means
of distributing power for copper
and/or aluminum cable.
A variety of pole configurations,
termination provisions
and gauge sizes is available.

INTERMEDIATE



Single and Multi-Pole
For Cu or Al cables - 600V AC -
Ratings 155 to 460A
Provides convenient means of distributing power for copper and/or aluminum cable.
A variety of pole configurations, termination provisions and gauge sizes is available.

LARGE



Single and Multi-Pole
For Cu or Al cables
600V AC - Ratings 380 to 1000A
Provides convenient means
of distributing power for copper
and/or aluminum cable.
A variety of pole configurations
termination provisions
and gauge sizes is available.

Switches

Non-Fused Switches

IT FRONT-HANDLE MODULAR



Switch-disconnectors
690V AC
Ratings 25 to 160A
DIN-Rail mount
Easy-to-install
accessories
IEC 947-3
Compliance.

IT FRONT-HANDLE



Switch-disconnectors
1000V AC
Ratings 250 to 800A
On-board or
frame mount
Totally visible interruption
IP2X Protection
with accessories
IEC 947-3 Compliance.

IT SIDE-HANDLE

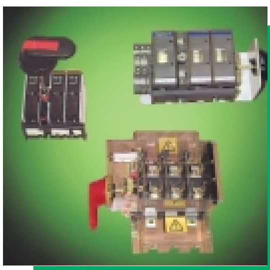


Switch-disconnectors
1000V AC
Ratings 250 to 800A
On-board or
frame mount
Totally visible interruption
IP2X Protection
with accessories
IEC 947-3 Compliance.

Fused Switches

ITC FOR FERRULE FUSES

Switch-disconnectors
750-1000V AC
Ratings
32 (10X38 mm)
to 125A (22x58mm)
DIN-Rail or
on-frame Mount
Front or side handle
IP2X Protection
IEC 947
1 & 3 Compliance.



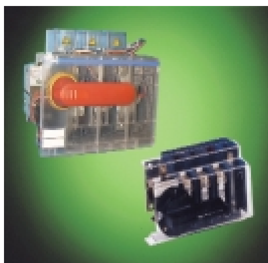
ITC FOR BLADE- STYLE FUSES

Switch-disconnectors
750-1000V AC
Ratings
63 (Size 00)
to 630A (Size 3)
Double interruption up
and downstream fuse
Front or side handle
IEC 947
1 & 3 Compliance.



ITCP FOR SEMICONDUCTOR FUSES

Switch-disconnectors
750-1000V AC
Ratings 50 to 800A
Ferrule sizes : 14x51,
22x58, 27x60 mm
Square body sizes :
000, 00, 0, 1, 2, 3
(French, German,
American Styles
3 -pole switches
IEC 947-3
Compliance.



Thermal and Power Management

Cooling Devices

AIR COOLING



High Exchange Rate RADIACAL
Thermal resistance
20 °c/kW
Finned heat sinks with improved performance versus conventional sinks
Aluminum-made fins brazed under vacuum with end machining
Optional fan and customized drillings

WATER COOLING



CALISTOR
MODUCAL
Copper or alumimum-made
Thermal resistance less than 10°c/kW
CALISTOR for Press-Pack components
MODUCAL for IGBT modules

HEAT PIPE EXCHANGERS



High-Performance TRANSCAL
For Press-Pack or IGBT components
Easy maintenance
Shock and vibration-proof

Power Switches

VERY HIGH CURRENT DISCONNECTORS & REVERSING SWITCHES

Up to 250kA DC

Copper or aluminum made

Large isolating distance

Easy-to-connect on solid bars



LOAD BREAK SWITCHES

600-1500V DC / 0-10kA

800V DC /8-20kA

660V DC /0-3kA

Visible opening

Railway industry or electrolysis applications



DISCONNECTORS 500V-36kV



- Maintenance free technology available
- Single throw disconnector
- Change over switches
- Polarity reversing switches
- For use in energy distribution, power plant, railway and electrolysis applications

SPECIALTIES



- charging plugs and socket devices
- Cekon, CEE plugs and socket devices cast aluminium splitter boxes and cast aluminium plug and socket devices for extremly rough environments (mines, navy, tunnels, shipbuilding, off shore)
- water cooled shorting switches

Current Collectors and Ground Return Current Units

CURRENT COLLECTORS

For third rail metro applications

Collects current and ensures input protection of the car by its associated traction fuses



Ground Return Current Units

For all trains, electrical or not, running on an electrical track.
This device prevents the current from flowing through the roller bearings of the axle box.
It therefore protects them against damage



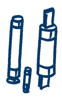
General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000® Fuses

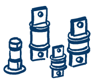


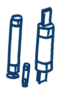
TRI-ONIC®

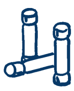


AMP-TRAP®

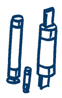




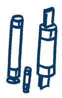




ONE-TIME

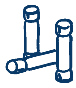


RENEWABLE



Midget Fuses

Time Delay



Fast Acting

PC Mount

French Ferrule Fuses



NH Fuses



DIN Fuses





General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000® Class J Time Delay AJT



MAXIMUM CIRCUIT PROTECTION, MINIMAL SIZE

Amp-trap 2000® AJT fuses can provide IEC Type 2 "no damage" type protection to main, feeder, and branch circuits, for all types of loads — yet, they require only half the mounting space needed for 600VAC Class R fuses. AJT's time delay characteristics for handling harmless in-rush currents, its current limiting ability (the most current limiting UL fuse class!), and wide range of ratings (from 1 to 600 Amperes) — give excellent protection for all your applications. An Indicator/Microswitch Mount (EI) is available on blade-type (70 to 600A) fuses for visual or remote indication of open fuse condition.

Features/Benefits

- ✔ **Time delay** for motor starting and transformer inrush
- ✔ **300kA interrupting rating** - self-certified, UL witnessed tests
- ✔ **Extremely current limiting** for low peak let-thru current
- ✔ **Most current limiting UL class fuse**
- ✔ **Small footprint** requires less mounting space and allows smaller, more economical fuse blocks
- ✔ **Easy 2-to-1 selectivity** for prevention of nuisance shutdowns
- ✔ **Unique Class J dimensions** prevent replacement errors
- ✔ **High-visibility orange label** gives instant recognition
- ✔ **Metal-embossed date and ref number** for traceability and lasting identification
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial settings
- ✔ **High-grade silica filler** ensures fast arc quenching
- ✔ **Optional EI Indicator/Switch mount** for AJT70 to 600 open fuse indication

HIGHLIGHTS:

- ✔ Time Delay
- ✔ Highly Current Limiting
- ✔ DC Ratings
- ✔ Optional Indicator (70 to 600A fuses)

APPLICATIONS:

- ✔ Motor Circuits
- ✔ Mains
- ✔ Feeders
- ✔ Branch Circuits
- ✔ Lighting, Heating & General Loads
- ✔ Transformers
- ✔ Control Panels
- ✔ Circuit Breaker Back-up
- ✔ Bus Duct
- ✔ Load Centers

Ratings

✔ **AC:** 1 to 600A 600VAC, 200kA I.R. (self certified for 600VAC, 300kA I.R., UL witnessed)

DC: 1 to 600A 500VDC, 100kA I.R.

Approvals

AJT (1-600):

- ✔ UL Listed to Standard 248-8
- ✔ DC Listed to UL Standard 198L
- ✔ CSA Certified to Standard C22.2 No. 248.8
- ✔ IEC 269-2-1

AJT (70-600) EI:

- ✔ UL Component Recognized
- ✔ DC Tested to UL Standard 198L

General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000® Class J Time Delay AJT

Standard Fuse Ampere Ratings, Catalog Numbers and Ref Numbers

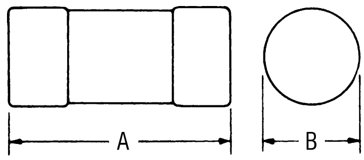
AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER
1	AJT1-1/4	C215765	4-1/2	AJT4-1/2	Y214749	25	AJT25	X211160	125	AJT125*	A217810*
1-1/4	AJT1-1/4	C215765	5	AJT5	H216276	30	AJT30	W213229	150	AJT150*	Y218843*
1-1/2	AJT1-1/2	B215258	5-6/10	AJT5-6/10	J216783	35	AJT35	M213727	175	AJT175*	K219889*
1-6/10	AJT1-6/10	G216275	6	AJT6	D217813	40	AJT40	C215259	200	AJT200*	Y200880*
1-8/10	AJT1-8/10	H216782	6-1/4	AJT6-1/4	P218329	45	AJT45	D215766	225	AJT225*	V211158*
2	AJT2	P219364	7	AJT7	Q219365	50	AJT50	Z217303	250	AJT250*	K212713*
2-1/4	AJT2-1/4	A200882	8	AJT8	M219891	60	AJT60	B218846	300	AJT300*	L213726*
2-1/2	AJT2-1/2	T223094	9	AJT9	D222574	70	AJT70*	L201421*	350	AJT350*	W214747*
2-8/10	AJT2-8/10	M201422	10	AJT10	Y217302	80	AJT80*	W211159*	400	AJT400*	G216781*
3	AJT3	Q211683	12	AJT12	C217812	90	AJT90*	V212193*	450	AJT450*	M218327*
3-2/10	AJT3-2/10	L212714	15	AJT15	N218328	100	AJT100*	B215764*	500	AJT500*	N219363*
3-1/2	AJT3-1/2	W212194	17-1/2	AJT17-1/2	A218845	110	AJT110*	F216780*	600	AJT600*	C222573*
4	AJT4	W214241	20	AJT20	Z201939						

*For optional indicator/switch mount add EI. For Example: AJT100EI

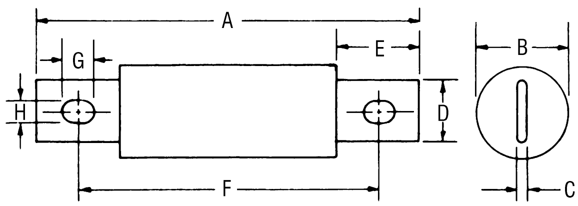
Recommended Fuse Blocks With Box Connectors for Amp-trap® Class J Fuses

Fuse Ampere Rating	600V OR LESS			
	1 Pole		3 pole	
	Cat N°	Ref N°	Cat N°	Ref N°
0-30	60306J	J211884	60308J	A214452
	US3J1	E212409	US3J3	J214460
31-60	60606J	L211886	60608J	F212916
	US6J1	M219592	US6J3	V205017
61-100	61036J	Z201640	61038J	G212917
101-200	62001J	D214455	62003J	E214962
201-400	64031J	X218543	64033J	S219068
401-600	6631J	P201125	6633J	A201641

A variety of pole configurations and termination provisions is available.



1-60A

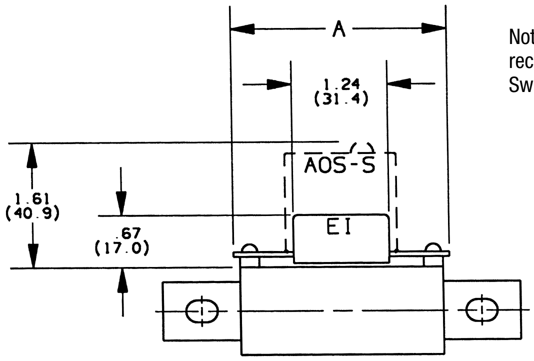


70-600A

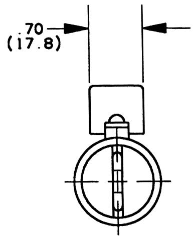
Dimensions

AMPERE RATING	A		B		C		D		E		F		G		H	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
1-30	2-1/4	57	13/16	21	-	-	-	-	-	-	-	-	-	-	-	-
31-60	2-3/8	60	1-1/16	27	-	-	-	-	-	-	-	-	-	-	-	-
61-100	4-5/8	117	1-1/8	29	1/8	3.2	3/4	19	1	25	3-5/8	92	3/8	10	9/32	7
101-200	5-3/4	146	1-5/8	41	3/16	4.8	1-1/8	29	1-3/8	35	4-3/8	111	3/8	10	9/32	7
201-400	7-1/8	181	2-1/8	54	1/4	6.3	1-5/8	41	1-7/8	48	5-1/4	133	17/32	14	13/32	10
401-600	8	203	2-1/2	64	3/8	9.5	2	51	2-1/8	54	6	152	11/16	18	17/32	13

Optional Indicator/Microswitch Mount (EI) dimensions:



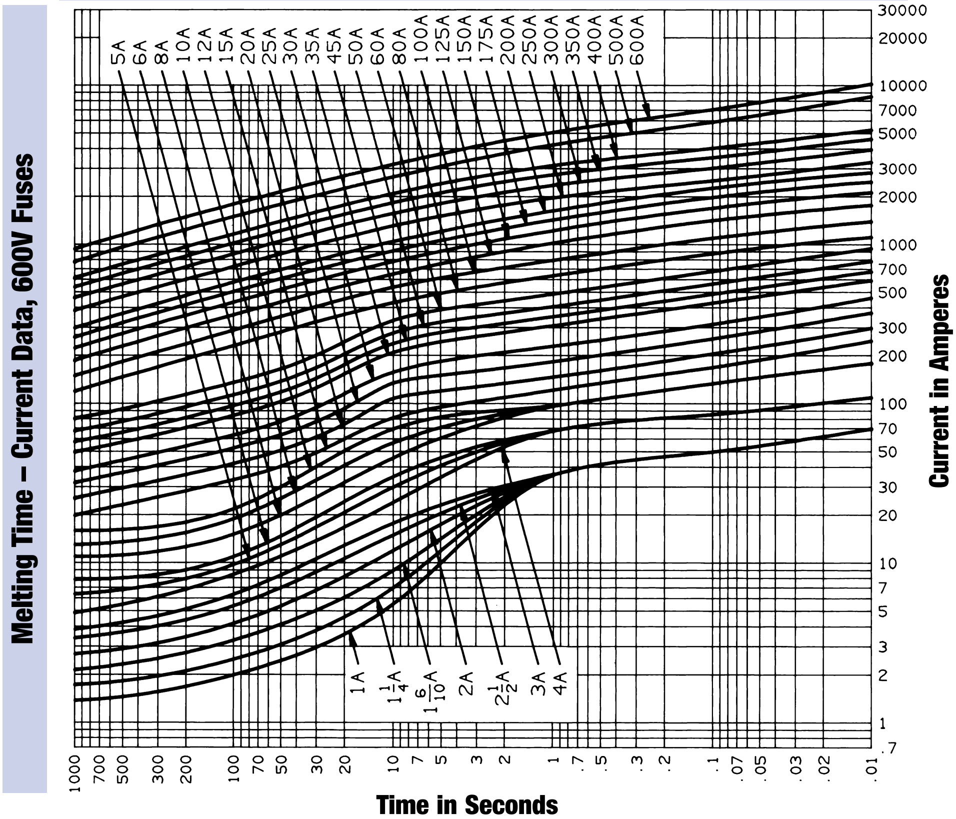
Note: Fuses with the EI option will receive the AOS-S or AOS-Q Add-On-Switch



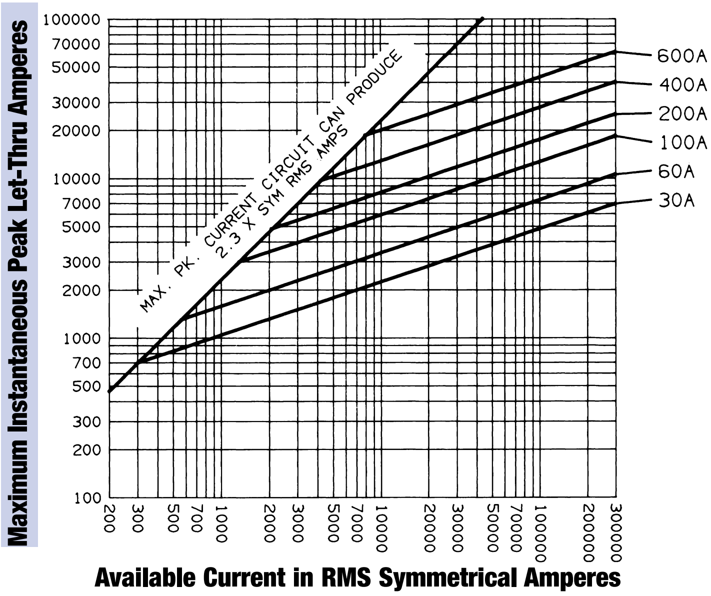
CAT. N°	REF. N°	A
AJT70EI AJT80EI AJT90EI AJT100EI	Y201938 P211682 V214240 F216274	2.80 (71.0)
AJT110EI AJT125EI AJT150EI AJT175EI AJT200EI	W217300 L218326 M219362 R223092 K201420	3.22 (81.8)
AJT225EI AJT250EI AJT300EI AJT350EI AJT400EI	N211681 V213228 T214239 A215257 X217301	3.24 (82.2)
AJT450EI AJT500EI AJT600EI	Z218844 L219890 S223093	3.61 (91.8)

AMP-TRAP 2000® Class J Time Delay AJT

AJT1 to 600



Peak Let-Thru Current Data – AJT30 to 600, 600 Volts AC



Three Phase Motor Fuse Selection

230 Volt Three Phase Class J AJT Fuses

Motor HP	Full Load Amperes at 230V	Recommended Fuse Ampere Rating Motor Acceleration Times Minimum 2 sec.	Typical 5 sec.	Heavy Load Over 5 sec.
1/2	2.2	3	3-1/2	4
3/4	3.2	4	5	6
1	4.2	5	6-1/4	8
1-1/2	6	8	9	10
2	6.8	8	10	12
3	9.6	12	15	17-1/2
5	15.2	20	25	30
7-1/2	22	30	35	40
10	28	35	40	50
15	42	50	60	80
20	54	70	80	100
25	68	80	100	125
30	80	100	125	150
40	104	125	150	200
50	130	175	200	250
60	154	200	225	300
75	192	250	300	350
100	248	300	350	450
125	312	400	450	600
150	360	450	500	600
200	480	600	-	-

General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000® Class J Time Delay AJT

Three Phase Motor Fuse Selection

380 Volt Three Phase Class J AJT Fuses

Motor HP	Full Load Amperes at 380V	Recommended Fuse Ampere Rating – Motor Acceleration Times: Minimum 2 sec.	Typical 5 sec.	Heavy Load Over 5 sec.
1/2	1.3	1-6/10	2	2-1/4
3/4	1.9	2-1/2	2-8/10	3-1/2
1	2.5	3-2/10	4	4-1/2
1-1/2	3.6	4-1/2	5-6/10	6
2	4.1	5	6	7
3	5.8	8	8	10
5	9.2	12	15	17-1/2
7-1/2	13.3	17-1/2	20	25
10	17	20	25	30
15	25	30	40	45
20	33	40	50	60
25	41	50	60	70
30	48	60	80	90
40	68	80	100	125
50	79	90	125	150
60	93	110	150	175
75	116	150	175	200
100	150	175	225	250
125	189	250	300	350
150	218	300	350	400
200	291	350	450	500

460 Volt Three Phase Class J AJT Fuses

Motor HP	Full Load Amperes at 460V	Recommended Fuse Ampere Rating – Motor Acceleration Times: Minimum 2 sec.	Typical 5 sec.	Heavy Load Over 5 sec.
1/2	1.1	1-1/2	1-6/10	2
3/4	1.6	2	2-1/4	3
1	2.1	2-1/2	3-2/10	4
1-1/2	3	3-1/2	4-1/2	5-6/10
2	3.4	4	5	6
3	4.8	6	8	9
5	7.6	10	12	15
7-1/2	11	15	15	20
10	14	17-1/2	20	25
15	21	25	30	40
20	27	35	40	50
25	34	40	50	60
30	40	50	60	70
40	52	70	80	90
50	65	80	100	125
60	77	100	125	150
75	96	125	150	175
100	124	175	200	250
125	156	200	225	300
150	180	225	250	350
200	240	300	350	450
250	302	400	450	600
300	361	450	600	-

Three Phase Motor Fuse Selection

575 Volt Three Phase Class J AJT Fuses

Motor HP	Full Load Amperes at 575V	Recommended Fuse Ampere Rating – Motor Acceleration Times: Minimum 2 sec.	Typical 5 sec.	Heavy Load Over 5 sec.
1/2	.9	1-1/4	1-1/2	1-6/10
3/4	1.3	1-6/10	2	1-1/2
1	1.7	2-1/4	2-1/2	3
1-1/2	2.4	3	3-1/2	4-1/2
2	2.7	3-2/10	4	5
3	3.9	5	6	7
5	6.1	8	9	12
7-1/2	9	12	15	17-1/2
10	11	15	17-1/2	20
15	17	20	25	30
20	22	30	35	35
25	27	35	40	50
30	32	40	50	60
40	41	50	60	70
50	52	70	80	90
60	62	80	90	110
75	77	100	125	150
100	99	125	150	175
125	125	150	200	225
150	144	175	225	250
200	192	250	300	350
250	240	300	350	400
300	289	350	450	500

Minimum - Minimum sizing may not be heavy enough for motors with code letter G or higher.

Typical - Suggested for most applications. Will coordinate with NEMA Class 20 overload relays. Suitable for motor acceleration times up to 5 seconds.

Heavy Load - In accordance with Table 430-152. If this fuse is not sufficient to start the load, it may be increased to a maximum of 225% of full-load amperes (430-52 Exc. 2b). Use this column for Design E Motors.

General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000® Class L Time Delay A4BQ



PUT THE HIGHEST CURRENT-LIMITATION... AT YOUR SERVICE.

Amp-trap 2000® A4BQ fuses are 20% more current limiting than any other Class L fuse on the market. When correctly coordinated, they bring a superior level of protection to service entrance equipment. Downstream circuit components have maximum protection against short circuit let-thru current. A4BQ's built-in, 4-second time delay characteristic (at 500% of rated current) accommodates harmless inrush currents with no nuisance opening.

Features/Benefits

- ✔ **Fastest operation under short circuit conditions:** Let-thru currents are typically 20% lower, with a corresponding let-thru energy (clearing I^2t) up to 40% lower than the next fastest Class L fuse
- ✔ **Time delay for high inrush loads** such as motors and transformers, without nuisance opening
- ✔ **300kA interrupting rating** - self-certified, UL witnessed tests
- ✔ **Most current limiting** for lowest peak let-thru current; even at fault currents up to 300kA
- ✔ **Pure silver links** ensure lowest let-thru current and longer fuse life
- ✔ **Easy 2-to-1 selectivity** for prevention of nuisance shutdowns and "blackouts"
- ✔ **Rejection-style design** prevents replacement errors
- ✔ **High-visibility orange label** gives instant recognition
- ✔ **Reduced inventory** because A4BQ can replace all older types of Class L fuses now in service
- ✔ **Metal-embossed date and ref number** for traceability and lasting identification
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial settings
- ✔ **High-grade silica filler** ensures fast arc quenching

HIGHLIGHTS:

- ✔ Time Delay
- ✔ Industry's Most Current-Limiting Class L Fuse
- ✔ Pure Silver Elements
- ✔ AC & DC Rated

Applications:

- ✔ Mains, Feeders
- ✔ Large Motors
- ✔ Lighting, Heating & General Loads
- ✔ Circuit Breaker Back-up
- ✔ DC Rated: UPS DC Links, Battery Disconnects, Other DC Applications

Ratings

- ✔ **AC:** 100 to 6000A 600VAC, 200kA I.R. (self certified for 600VAC, 300kA I.R., UL witnessed) 4-second delay at 500% rating
  Note: 100-600A ratings are non-listed

  DC: 601 to 3000A 500VDC, 100kA I.R.

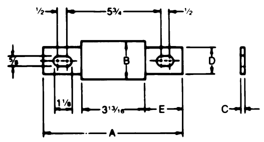
Approvals

- ✔ UL Listed to Standard 248-10 (601-6000A)
- ✔ DC Listed to UL Standard 198L (601-3000A)
- ✔ CSA Certified to Standard C22.2 No. 248.10 (601-6000A)
- ✔ IEC 269-2-1

AMP-TRAP 2000® Class L Time Delay A4BQ

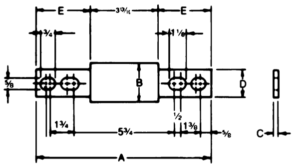
Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
100	A4BQ100	J215771	500	A4BQ500	F214756	1000	A4BQ1000	P216282	2000	A4BQ2000	B223101
150	A4BQ150	X218336	600	A4BQ600	K215772	1200	A4BQ1200	R216790	2500	A4BQ2500	V201429
200	A4BQ200	L222581	601	A4BQ601	H217311	1350	A4BQ1350	G217310	3000	A4BQ3000	F211168
250	A4BQ250	H200889	650	A4BQ650	M217821	1400	A4BQ1400	L217820	3500	A4BQ3500	E212202
300	A4BQ300	F201945	700	A4BQ700	Y218337	1500	A4BQ1500	J218853	4000	A4BQ4000	W213735
350	A4BQ350	Y211690	750	A4BQ750	K218854	1600	A4BQ1600	Y219372	5000	A4BQ5000	K215266
400	A4BQ400	E213237	800	A4BQ800	Z219373	1800	A4BQ1800	V219898	6000	A4BQ6000	Q216283
450	A4BQ450	D214248	900	A4BQ900	W219899						



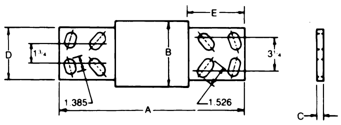
601-800A

100-800A



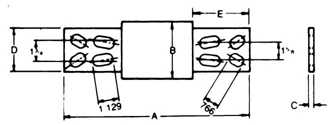
801-2000A

801-2000A



3001-4000A

3001-4000A

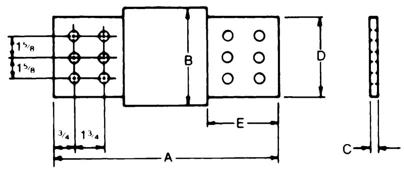


2001-3000A

2001-3000A

Dimensions

AMPERE RATING	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
100-600*	8-5/8	219	2	51	5/16	8	1-5/8	41	2-13/32	61
601-800	8-5/8	219	2-1/2	63	3/8	9	2	51	2-13/32	61
801-1200	10-3/4	273	2-1/2	63	3/8	9	2	51	3-15/32	88
1201-1600	10-3/4	273	3	76	7/16	11	2-3/8	60	3-15/32	88
1601-2000	10-3/4	273	3-1/2	89	1/2	12	2-3/4	70	3-15/32	88
2001-2500	10-3/4	273	4-1/2	114	3/4	19	3-1/2	89	3-15/32	88
2501-3000	10-3/4	273	5	127	3/4	19	4	102	3-15/32	88
3001-4000	10-3/4	273	5-3/4	146	3/4	19	4-3/4	121	3-15/32	88
4001-5000	10-3/4	273	6-1/4	159	1	25	5-1/4	133	3-15/32	88
5001-6000	10-3/4	273	7-1/8	181	1	25	5-3/4	146	3-15/32	88



4001-6000A

Safety Note: Class L fuses are dimensioned for one-way interchangeability. A Class L fuse of any lower ampere rating can be substituted for a given Class L fuse.

*Not UL Listed or CSA Certified

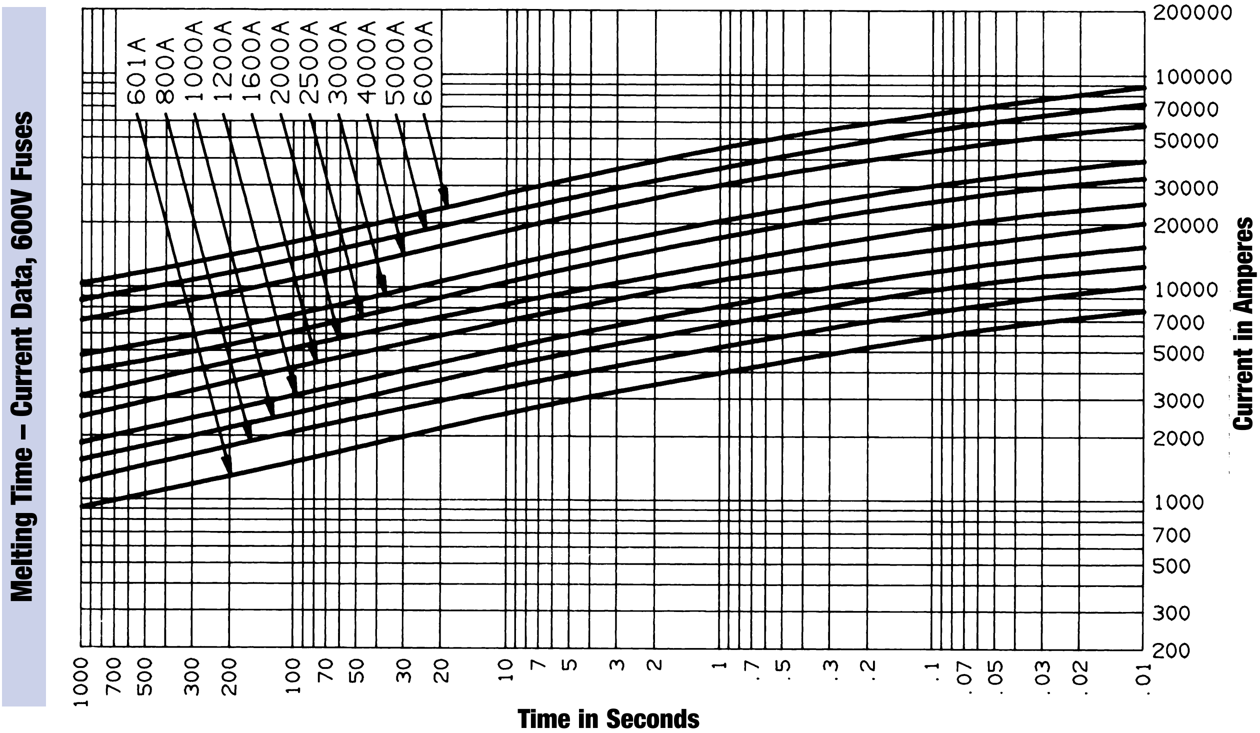
A4BQ (601 to 6000) Let-Thru Current in kilo-Amperes

Available Fault RMS AMPS	601		800		1000		1200		1600		2000		2500		3000		4000		5000		6000	
	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip	RMS	Ip
10,000	7.4	17	8.7	20	10	23	10	23	10	23	10	23	10	23	10	23	10	23	10	23	10	23
15,000	8.3	19	10	23	12	27	13	30	15	35	15	35	15	35	15	35	15	35	15	35	15	35
20,000	9.1	21	11	25	13	29	14	33	17	39	20	46	20	46	20	46	20	46	20	46	20	46
25,000	9.8	23	12	27	13	31	15	35	18	42	22	50	25	58	25	58	25	58	25	58	25	58
30,000	10	24	13	29	14	33	16	37	20	45	23	53	29	66	30	69	30	69	30	69	30	69
35,000	11	25	13	30	15	35	17	39	20	47	24	56	30	69	35	81	35	81	35	81	35	81
40,000	12	27	14	32	16	37	18	41	21	49	25	58	31	72	36	83	40	92	40	92	40	92
50,000	13	29	15	34	17	40	19	44	23	53	27	63	34	78	39	89	48	111	50	115	50	115
60,000	13	30	16	36	18	42	20	47	25	57	29	67	36	83	41	94	51	118	60	138	60	138
80,000	14	33	17	40	20	46	23	52	27	62	32	73	40	91	45	104	57	130	67	153	77	176
100,000	16	36	19	43	22	50	24	56	29	67	34	79	43	98	49	112	61	140	72	165	83	190
150,000	18	41	21	49	25	57	28	64	33	77	39	90	49	112	56	128	70	160	82	189	94	217
200,000	20	45	24	54	27	63	31	71	37	84	43	100	53	123	61	141	77	176	90	208	104	239

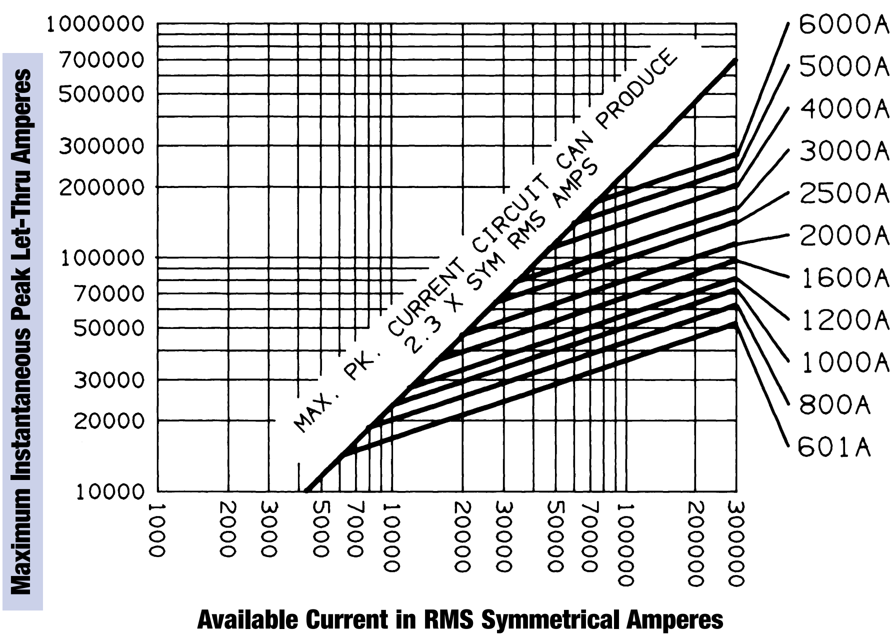
The current limiting effect of A4BQ Class L fuses is presented in the table above. This table correlates actual fuse peak let-thru currents with equal value peak currents reached in the first half cycle (worst case) of short circuits in unfused circuits. The let-thru current is expressed as "Apparent RMS Symmetrical Amperes" in order to be more useful for practical applications. The currents are based on an assumed 15% power factor. Example: An A4BQ1200, when applied in a circuit with 40,000 RMS symmetrical amperes available, will limit that current during a short circuit, to an apparent 18,000 RMS symmetrical amperes. Under this condition, any equipment being protected would be subjected to only 18,000 RMS amperes.

AMP-TRAP 2000® Class L Time Delay A4BQ

A4BQ601 to 6000



Peak Let-Thru Current Data – A4BQ601 to 6000, 600 Volts AC



AMP-TRAP 2000® Class RK1 Time Delay A2D & A6D



UPGRADE YESTERDAY'S CIRCUITS TO TODAY'S TYPE 2 PROTECTION.

Properly applied, Amp-trap 2000® A2D and A6D fuses are the superior way to extend today's IEC Type 2 "no damage" protection to existing mains, feeders, and branch circuits serving motor and non-motor loads. A2D and A6D fuses will open fast enough under short circuit conditions for maximum short circuit protection to prevent needless damage to motor starters, switches, and other circuit components, yet are slow enough to provide the long time delay for transient surges.

Features/Benefits

- ✔ **Time delay** for motor starting and transformer inrush currents without nuisance opening
- ✔ **300kA interrupting rating** - self-certified, UL witnessed tests
- ✔ **Extremely Current Limiting** for low peak let-thru current
- ✔ **Easy 2-to-1 selectivity** for prevention of nuisance shut downs and "black outs"
- ✔ **Rejection-style design** prevents replacement errors (when used with recommended fuse blocks)
- ✔ **High-visibility orange label** gives instant recognition
- ✔ **Reduced inventory** by taking the place of RK5, K, and H fuses
- ✔ **Metal-embossed date and ref number** for easier traceability and lasting identification
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial settings
- ✔ **Brass end-caps** (blade-style) for cooler operation and superior performance
- ✔ **High-grade silica filler** ensures fast arc quenching

HIGHLIGHTS:

- ✔ Time Delay
- ✔ Current Limiting
- ✔ Plated Terminals

APPLICATIONS:

- ✔ Motors
- ✔ Safety Switches
- ✔ Transformers
- ✔ Branch Circuit Protection
- ✔ Disconnects
- ✔ Control Panels
- ✔ All General-purpose Circuits

Ratings

- ✔ **A2D**
  AC: 1/10 to 600A
  250VAC, 200kA I.R.
  (self certified for 250VAC, 300kA I.R., UL witnessed)
- ✔ **A6D**
  AC: 1/10 to 600A
  600VAC, 200kA I.R.
  (self certified for 600VAC, 300kA I.R.)

Approvals

- ✔ UL Listed to Standard 248-12
- ✔ CSA Certified to Standard C22.2 No. 248.12

Ferraz Shawmut

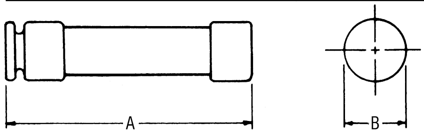
General Purpose Fuses

North American Power Fuses

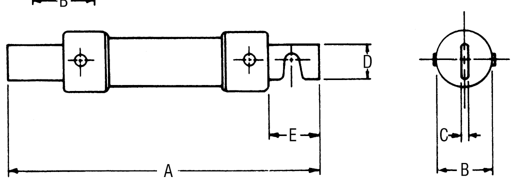
AMP-TRAP 2000® Class RK1 Time Delay A2D & A6D

Standard Fuse Ampere Ratings

Ampere	Catalog Number		Reference Number		Ampere	Catalog Number		Reference Number	
Rating	250V	600V	250V	600V	Rating	250V	600V	250V	600V
1/10	A2D1/10R	A6D1/10R	Q215248	R201932	10	A2D10R	A6D10R	Z216268	G211675
15/100	A2D15/100R	A6D15/100R	M217292	D212707	12	A2D12R	A6D12R	Z216774	M212186
2/10	A2D2/10R	A6D2/10R	J223085	C216271	15	A2D15R	A6D15R	R217802	N213222
3/10	A2D3/10R	A6D3/10R	K212184	G219357	17-1/2	A2D17-1/2R	A6D17-1/2R	C218318	E213720
4/10	A2D4/10R	A6D4/10R	N214740	E201415	20	A2D20R	A6D20R	P200872	C216777
1/2	A2D1/2R	A6D1/2R	T215757	P211153	25	A2D25R	A6D25R	B201412	Q217295
6/10	A2D6/10R	A6D6/10R	R218837	N214234	30	A2D30R	A6D30R	B212705	E219884
8/10	A2D8/10R	A6D8/10R	Q200873	D216778	35	A2D35R	A6D35R	L213220	W222567
1	A2D1R	A6D1R	Q218836	M214233	40	A2D40R	A6D40R	R215249	S201933
1-1/8	A2D1-1/8R	A6D1-1/8R	K213219	V222566	45	A2D45R	A6D45R	V215758	Q211154
1-1/4	A2D1-1/4R	A6D1-1/4R	A212704	D219883	50	A2D50R	A6D50R	N217293	E212708
1-4/10	A2D1-4/10R	A6D1-4/10R	B213717	L223087	60	A2D60R	A6D60R	E219355	R214743
1-6/10	A2D1-6/10R	A6D1-6/10R	J214230	R200874	70	A2D70R	A6D70R	N201929	E218320
1-8/10	A2D1-8/10R	A6D1-8/10R	M214739	D201414	75	A2D75R	-	L211150	-
2	A2D2R	A6D2R	P201930	V217805	80	A2D80R	A6D80R	D211672	S218838
2-1/4	A2D2-1/4R	A6D2-1/4R	C219882	T215251	90	A2D90R	A6D90R	J212183	F219356
2-1/2	A2D2-1/2R	A6D2-1/2R	D219354	Q214742	100	A2D100R	A6D100R	P215247	N211152
2-8/10	A2D2-8/10R	A6D2-8/10R	S222564	X215760	110	A2D110R	A6D110R	S215756	F211674
3	A2D3R	A6D3R	C213718	M223088	125	A2D125R	A6D125R	Y216267	L212185
3-2/10	A2D3-2/10R	A6D3-2/10R	E211673	T218839	150	A2D150R	A6D150R	Y216773	C212706
3-1/2	A2D3-1/2R	A6D3-1/2R	M211151	F218321	175	A2D175R	A6D175R	L217291	M213221
4	A2D4R	A6D4R	A216269	H211676	200	A2D200R	A6D200R	Q217801	D213719
4-1/2	A2D4-1/2R	A6D4-1/2R	K214231	S200875	225	A2D225R	A6D225R	B218317	L214232
5	A2D5R	A6D5R	S217803	P213223	250	A2D250R	A6D250R	P218835	P214741
5-6/10	A2D5-6/10R	A6D5-6/10R	A216775	N212187	300	A2D300R	A6D300R	C219353	S215250
6	A2D6R	A6D6R	T222565	V215252	350	A2D350R	A6D350R	B219881	W215759
6-1/4	A2D6-1/4R	A6D6-1/4R	D218319	F213721	400	A2D400R	A6D400R	R222563	B216270
7	A2D7R	A6D7R	K223086	Y215761	450	A2D450R	A6D450R	H223084	B216776
8	A2D8R	A6D8R	C201413	R217296	500	A2D500R	A6D500R	N200871	P217294
9	A2D9R	A6D9R	Q201931	W217806	600	A2D600R	A6D600R	A201411	T217804



0-60A



61-600A

Dimensions

AMPERE RATING	A In.	A mm	B In.	B mm	C In.	C mm	D In.	D mm	E In.	E mm
250V-A2D										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-/8	149	1-1/16	27	1/8	3	3/4	19	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	53	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-A6D										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

Recommended Fuse Blocks With Box Connectors for Amp-trap® Class RK1 Fuses

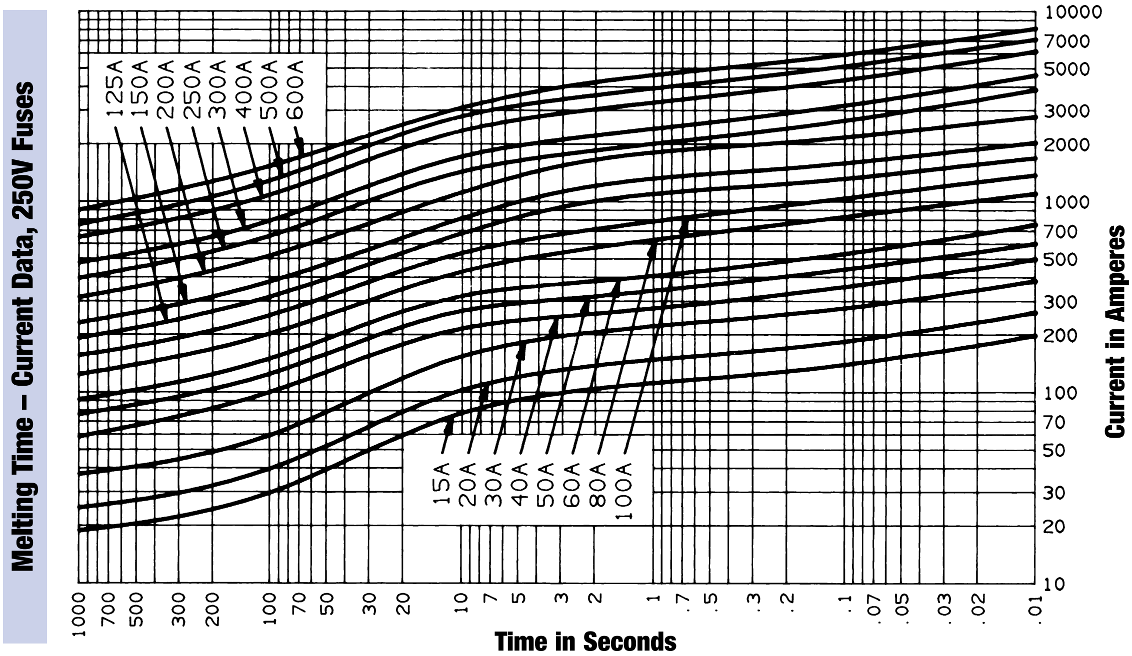
Fuse Ampere	Catalog Number		Ref. Number	
	250V		250V	
Rating	1 Pole	3 pole	1 pole	3 pole
0-30	20306R	20308R	T213411	K215956
31-60	20606R	20608R	B212383	E214939
61-100	21036R	21038R	D201621	M212899
101-200	22001R	22003R	R213915	G214941
201-400	24001R	24003R	J219566	D222022
401-600	2631R	2633R	H214942	P215960

Fuse Ampere	Catalog Number		Ref. Number	
	600V		600V	
Rating	1 Pole	3 pole	1 pole	3 pole
0-30	60306R	60308R	H212389	K214438
31-60	60606R	60608R	K212391	M214440
61-100	61036R	61038R	W204788	Z211875
101-200	62001R	62003R	V212906	B213924
201-400	64001R	64003R	D219055	M222030
401-600	6631R	6633R	J216990	E218021

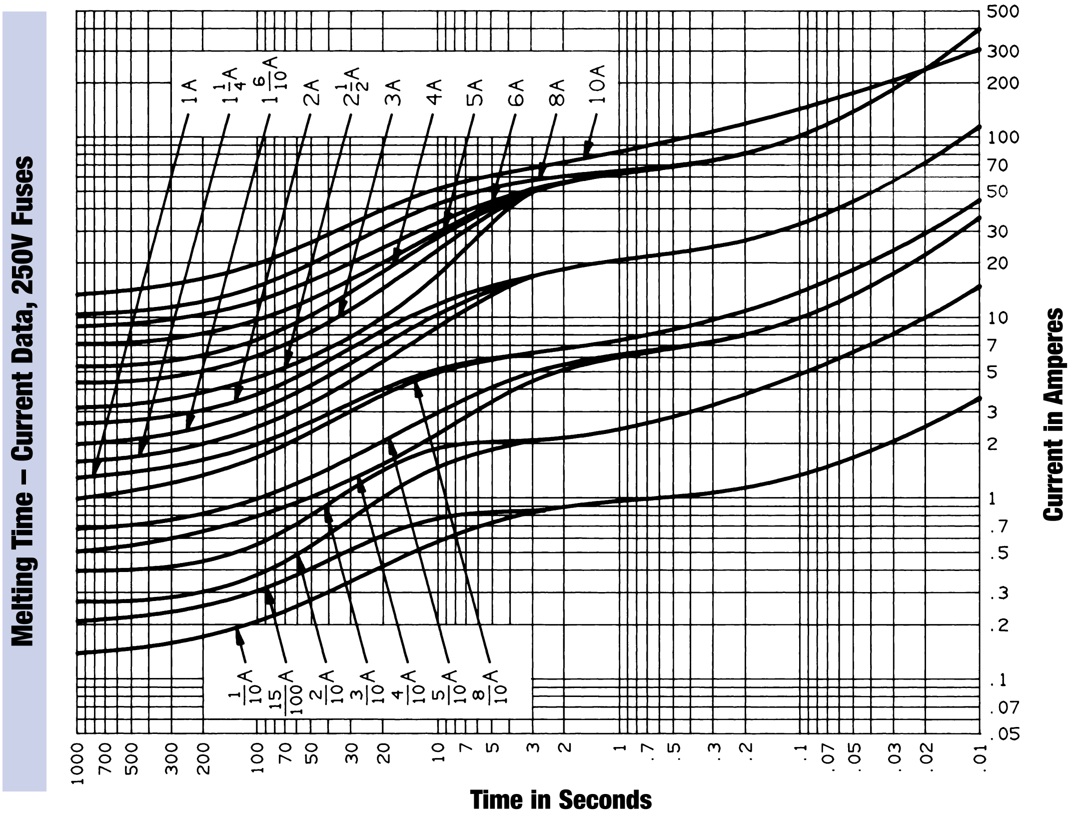
A variety of pole configurations and termination provisions is available.

AMP-TRAP 2000® Class RK1 Time Delay A2D & A6D

A2D15 to 600

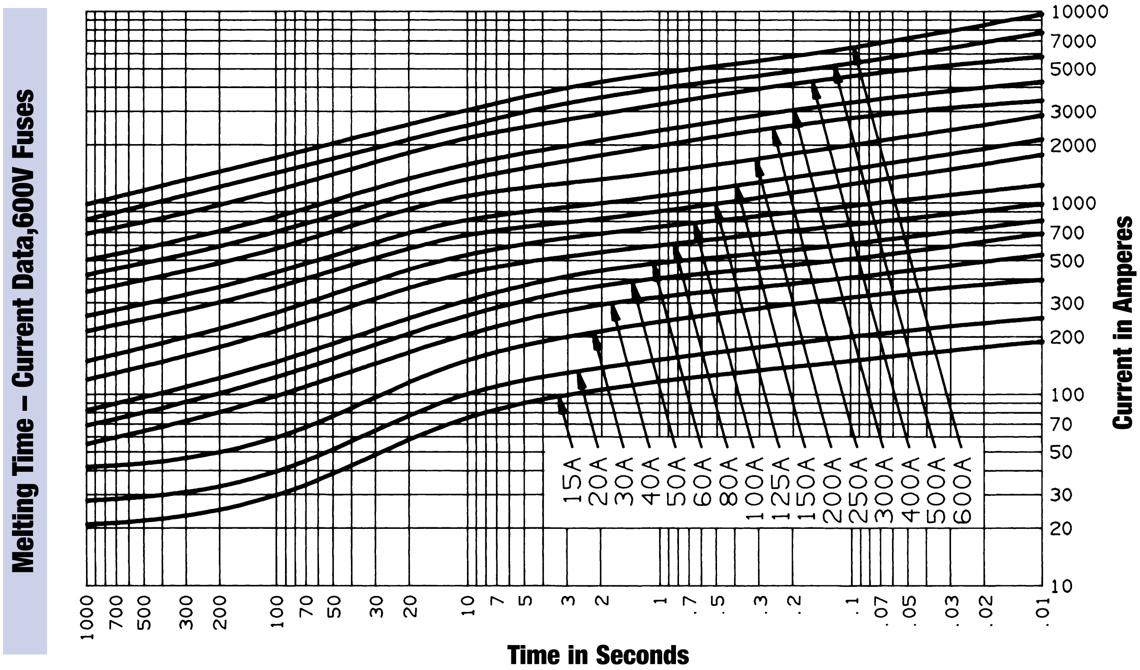


A2D1/10 to 10

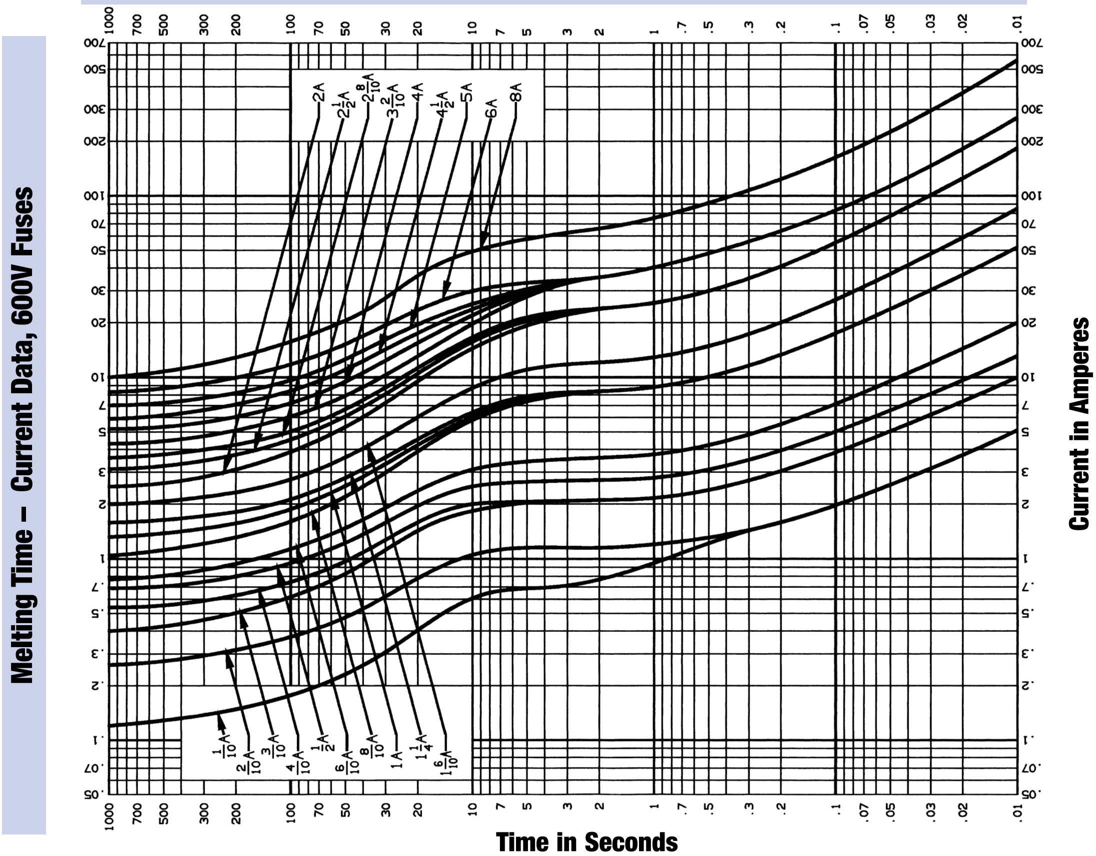


AMP-TRAP 2000® Class RK1 Time Delay A2D & A6D

A6D15 to 600

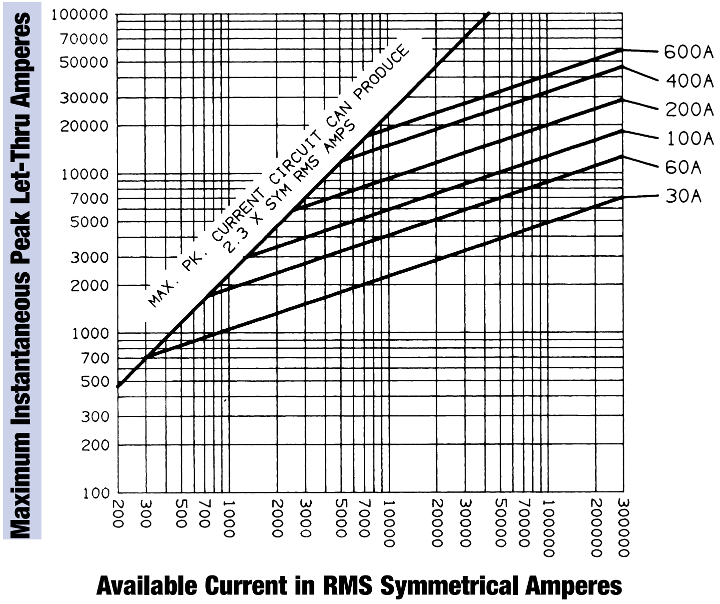


A6D1/10 to 8



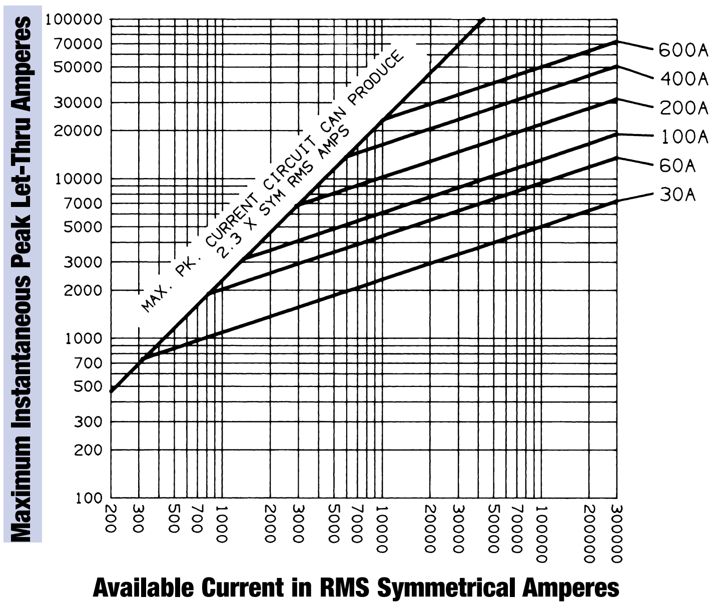
AMP-TRAP 2000® Class RK1 Time Delay A2D & A6D

Peak Let-Thru Current Data – A2D30 to 600, 250 Volts AC



Note: See Application Information section of catalog (Low Voltage Fuses For Motor Protection) for guidelines on Three Phase Motor Fuse Selection, Class RK1 A2D & RK1 A6D fuses

Peak Let-Thru Current Data – A6D30 to 600, 600 Volts AC



AMP-TRAP 2000® Class CC Time Delay ATDR



THE BEST PROTECTION FOR TODAY'S SMALL MOTORS.

Amp-trap 2000® ATDR small-dimension fuses can provide IEC Type 2 "no damage" protection to your facility's increasingly sensitive branch circuit components and small motors – minimizing the risk of fault-related damage. ATDR Class CC fuses deliver the best time delay characteristics in their class with excellent cycling ability for small motor loads.

Features/Benefits

- ✔ **Time delay** for motor starting inrush currents without nuisance opening
- ✔ **Highly current limiting** for low peak let-thru current
- ✔ **Improved cycling ability** for frequent motor starts/stops without nuisance fuse opening
- ✔ **Rejection-style design** prevents replacement errors (when used with recommended fuse blocks)
- ✔ **High-visibility orange label** ensures instant recognition, simplifies replacement
- ✔ **Metal-embossed date and reference number** for traceability and lasting identification
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial settings
- ✔ **High-grade silica filler** ensures fast arc quenching and optimum current limitation

HIGHLIGHTS:

- ✔ Time Delay
- ✔ Best Choice for Small Motor Protection
- ✔ Highly Current-Limiting
- ✔ AC & DC Rated

APPLICATIONS:

- ✔ Small Motors
- ✔ Contactors
- ✔ Lighting, Heating & General Loads

Ratings

- ✔ **AC:** 1/4 to 30A 600VAC, 200kA I.R.

  DC: 1/4 to 30A 300VDC, 100kA I.R.

Approvals

- ✔ UL Listed to Standard 248-4
- ✔ CSA Certified to Standard C22.2 No. 248.4
- ✔ DC Listed to UL Standard 198L

* The 1996 National Electrical Code allows time-delay Class CC fuses to be sized at up to 400% (maximum) of motor FLA, if needed.

General Purpose Fuses

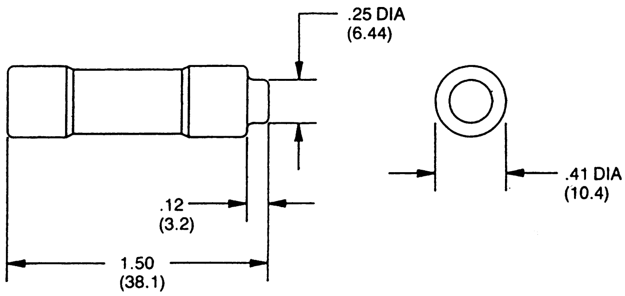
North American Power Fuses

AMP-TRAP 2000® Class CC Time Delay ATDR

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG. NUMBER	REF. NUMBER	AMPERE RATING	CATALOG. NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER
1/4	ATDR1/4	W200855	1-8/10	ATDR1-8/10	Z222547	4-1/2	ATDR4-1/2	Z217786	10	ATDR10	J201396
1/2	ATDR1/2	Q223068	2	ATDR2	S212168	5	ATDR5	K218302	12	ATDR12	X201914
8/10	ATDR8/10	K201397	2-1/4	ATDR2-1/4	T213204	5-6/10	ATDR5-6/10	Z218821	15	ATDR15	V211135
1	ATDR1	T217275	2-1/2	ATDR2-1/2	J212689	6	ATDR6	L219338	17-1/2	ATDR17-1/2	L211656
1-1/8	ATDR1-1/8	Y218820	2-8/10	ATDR2-8/10	L213703	6-1/4	ATDR6-1/4	L219867	20	ATDR20	R214214
1-1/4	ATDR1-1/4	J218301	3	ATDR3	Y215232	7	ATDR7	A222548	25	ATDR25	V214723
1-4/10	ATDR1-4/10	K219337	3-2/10	ATDR3-2/10	J216254	7-1/2	ATDR7-1/2	R223069	30	ATDR30	G216758
1-1/2	ATDR1-1/2	Y217785	3-1/2	ATDR3-1/2	C215742	8	ATDR8	X200856			
1-6/10	ATDR1-6/10	K219866	4	ATDR4	V217276	9	ATDR9	Y201915			

Dimensions



Small Motor Fuse Protection, 600 Volts AC or Less

MOTOR FULL LOAD AMPERES	ATDR RATING* MINIMUM DUTY	ATDR RATING* NORMAL DUTY
.71 - .89	1-1/4	1-6/10
.90 - 1.19	1-6/10	2
1.20 - 1.34	2	2-1/2
1.35 - 1.79	2-1/2	3
1.80 - 2.25	3	4
2.26 - 2.69	4	5
2.70 - 2.90	4	6
2.91 - 3.20	5	6
3.21 - 3.75	5	7
3.76 - 4.50	6	8
4.51 - 5.34	8	10
5.35 - 5.69	10	12
5.70 - 6.70	12	12
6.71 - 7.79	12	15
7.80 - 8.88	15	17-1/2
8.89 - 11.1	17-1/2	20
11.2 - 13.3	20	25
13.4 - 15.2	25	30

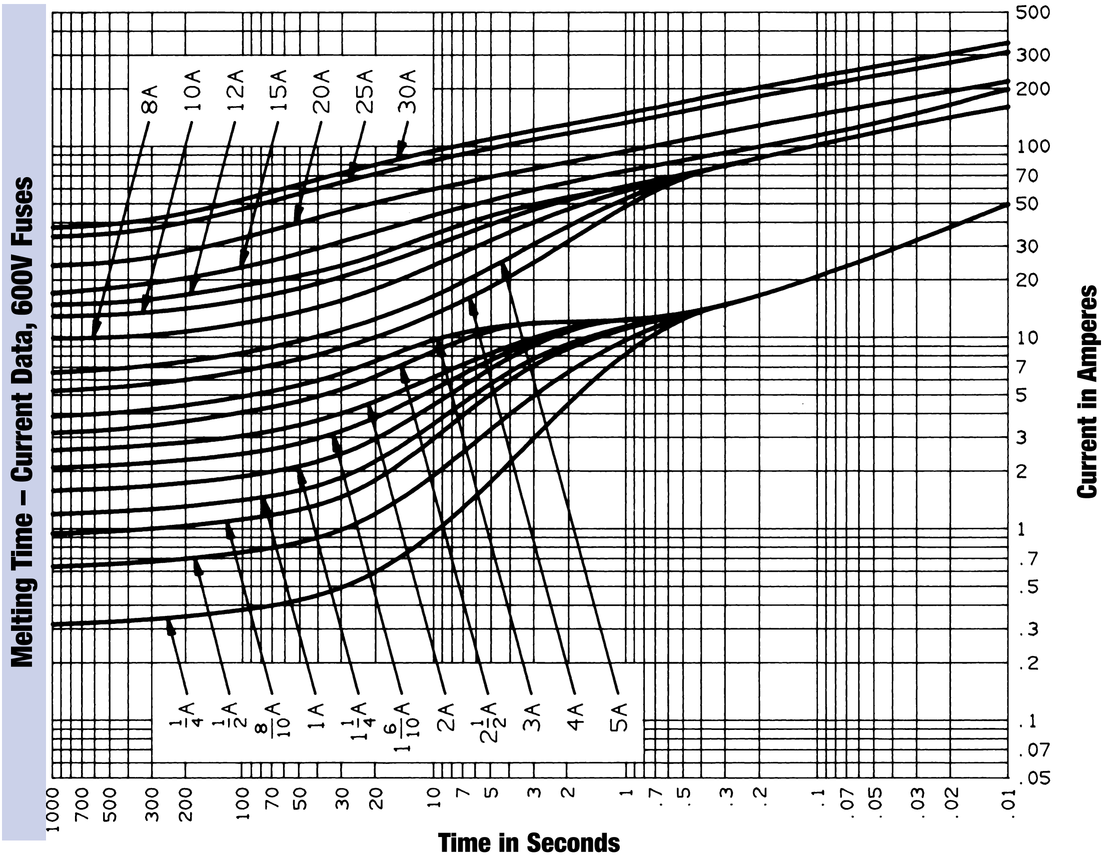
* The 1996 National Electrical Code allows time-delay Class CC fuses to be sized at up to 400% (maximum) of motor FLA, if needed.

Recommended Fuse Blocks for Class CC Fuses

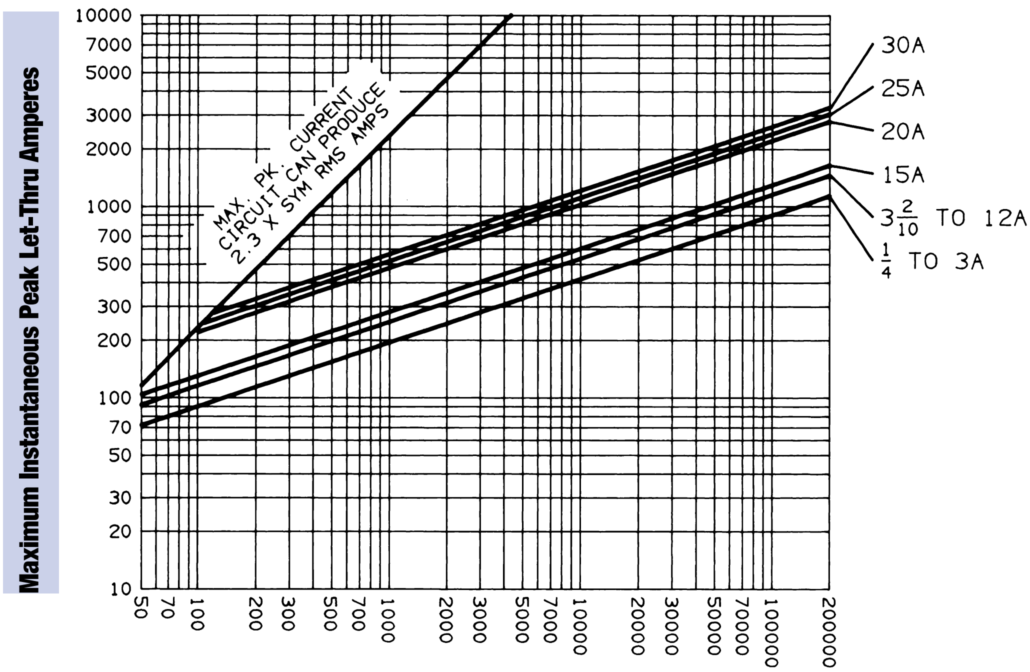
Number of Poles	CATALOG NUMBER: ULTRASAFE Indicating Fuse Holder	CATALOG NUMBER: Screw Connector w/ Double Quick Connects	CATALOG NUMBER: Pressure Plate Connector w/ Double Quick Connects	CATALOG NUMBER: Copper Box Connector	REFERENCE NUMBER: ULTRASAFE Indicating Fuse Holder	REFERENCE NUMBER: Screw Connector w/ Double Quick Connects	REFERENCE NUMBER: Pressure Plate Connector w/ Double Quick Connects	REFERENCE NUMBER: Copper Box Connector
ADDER		30310R	30320R	30350R		W204857	Z217510	N213429
1	USCC1I	30311R	30321R	30351R	X213943	R212397	M218534	G213929
2	USCC2I	30312R	30322R	30352R	D217008	Z212910	Y219579	V214447
3	USCC3I	30313R	30323R	30353R	Y218038	M213428	B222779	X214955

AMP-TRAP 2000® Class CC Time Delay ATDR

ATDR1/4 to 30



Peak Let-Thru Current Data – ATDR1/4 to 30, 600 Volts AC



General Purpose Fuses

North American Power Fuses

AMP-TRAP 2000® Class CC Time Delay ATQR



TAKE CONTROL OF FAULT CURRENTS HEADED FOR YOUR CONTROL TRANSFORMER

ATQR small-dimension fuses feature time delay characteristics ideally suited for the high inrush currents of today's control transformers, solenoids, and similar inductive loads. The newest member of our Amp-trap 2000® family of fuses - ATQR fuses provide superior protection for the branch circuits of electrical distribution systems.

Features/Benefits

- ✔ **Time delay** for control transformer inrush loads without nuisance opening
- ✔ **Highly current limiting** for low peak let-thru current
- ✔ **Rejection-style design** prevents replacement errors (when used with recommended fuse blocks)
- ✔ **High-visibility orange label** ensures instant recognition, and simplifies replacement
- ✔ **Metal-embossed date and reference number** for traceability and lasting identification
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial settings
- ✔ **High-grade silica filler** ensures fast arc quenching and high current limitation

HIGHLIGHTS:

- ✔ Time Delay
- ✔ Best Choice for Small Transformer Protection
- ✔ Most Current-Limiting

APPLICATIONS:

- ✔ Control Transformers
- ✔ Solenoids
- ✔ Inductive Loads
- ✔ Lighting, Heating & General-purpose Loads

Ratings

- ✔ **AC:** 1/10 to 30A 600VAC, 200kA I.R.

Approvals

- ✔ UL Listed to Standard 248-4
- ✔ CSA Certified to Standard C22.2 No. 248.4

AMP-TRAP 2000® Class CC Time Delay ATQR

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER
1/10	ATQR1/10	E201921	8/10	ATQR8/10	L215750	2-8/10	ATQR2-8/10	Q216260	7-1/2	ATQR7-1/2	E214732
1/8	ATQR1/8	A212175	1	ATQR1	F218827	3	ATQR3	T218310	8	ATQR8	H215241
15/100	ATQR15/100	S223507	1-1/8	ATQR1-1/8	H222555	3-2/10	ATQR3-2/10	V219346	9	ATQR9	R216261
3/16	ATQR3/16	J222556	1-1/4	ATQR1-1/4	T219874	3-1/2	ATQR3-1/2	G218828	10	ATQR10	S212697
2/10	ATQR2/10	Q216766	1-4/10	ATQR1-4/10	Z223076	4	ATQR4	S201404	12	ATQR12	C213212
1/4	ATQR1/4	V211664	1-1/2	ATQR1-1/2	T219345	4-1/2	ATQR4-1/2	F201922	15	ATQR15	T213710
3/10	ATQR3/10	V219875	1-6/10	ATQR1-6/10	E200863	5	ATQR5	W211665	17-1/2	ATQR17-1/2	A214222
4/10	ATQR4/10	D211143	1-8/10	ATQR1-8/10	R201403	5-6/10	ATQR5-6/10	B212176	20	ATQR20	D217284
1/2	ATQR1/2	C211142	2	ATQR2	D214731	6	ATQR6	T212698	25	ATQR25	H217794
6/10	ATQR6/10	V213711	2-1/4	ATQR2-1/4	K215749	6-1/4	ATQR6-1/4	D213213	30	ATQR30	F200864
3/4	ATQR3/4	A223077	2-1/2	ATQR2-1/2	G215240	7	ATQR7	B214223			

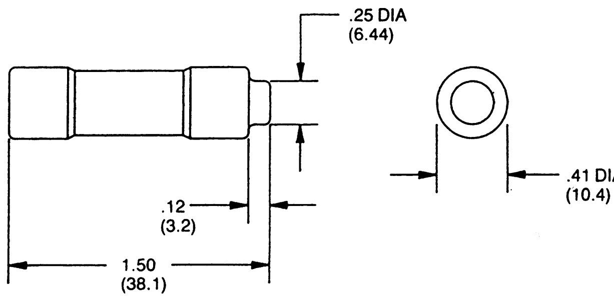
Recommended ATQR Class CC Primary Fuses For Single Phase Control Transformers

TRANS VA	PRIMARY VOLTS	PRIMARY FLA	ATQR AMPS
25	600	0.04	1/10
	480	0.05	1/10
	240	0.10	2/10
	208	0.12	1/4
	120	0.21	4/10
50	600	0.08	1/4
	480	0.10	1/4
	240	0.21	4/10
	208	0.24	1/2
	120	0.42	6/10
75	600	0.13	1/4
	480	0.16	3/10
	240	0.31	1/2
	208	0.36	3/4
	120	0.63	1
100	600	0.17	3/10
	480	0.21	4/10
	240	0.42	6/10
	208	0.48	1
	120	0.83	1-1/2
150	600	0.25	1/2
	480	0.31	1/2
	240	0.63	1
	208	0.72	1-1/2
	120	1.25	2-1/2
200	600	0.33	1/2
	480	0.42	6/10
	240	0.83	1-1/2
	208	0.96	2
	120	1.67	3
250	600	0.42	6/10
	480	0.52	1-1/8
	240	1.04	2
	208	1.2	3
	120	2.08	4*

TRANS VA	PRIMARY VOLTS	PRIMARY FLA	ATQR AMPS
300	600	0.50	1-1/8
	480	0.63	1-1/2
	240	1.25	2-1/2
	208	1.44	3
	120	2.5	5*
500	600	0.83	1-1/2
	480	1.04	2
	240	2.08	4*
	208	2.40	6*
	120	4.17	10*
750	600	1.25	2-1/2
	480	1.56	3
	240	3.13	7*
	208	3.61	8*
	120	6.25	15*
1000	600	1.67	3
	480	2.08	4*
	240	4.16	10*
	208	4.81	12*
	120	8.33	20*
1500	600	2.50	5*
	480	3.13	7*
	240	6.25	10
	208	7.21	20*
	120	12.5	25*
2000	600	3.33	8*
	480	4.17	10*
	240	8.33	20++*
	208	9.62	20++*
3000	600	5.00	12+*
	480	6.25	15+*
	240	12.5	30++*
5000	600	8.33	20++*
	480	10.4	25+*

* Secondary protection is required for these ratings.
\+ Fuse will withstand 30 x FLA for .01 second
++ Fuse will withstand 25 x FLA for .01 second

Dimensions



Recommended Fuse Blocks for Class CC Fuses

Catalog Number

Number of Poles	ULTRASAFE Indicating Fuse Holder	Screw with Double Quick Connects	Pressure Plate with Double Quick Connects	Copper Box Connector
ADDER		30310R	30320R	30350R
1	USCC1I	30311R	30321R	30351R
2	USCC2I	30312R	30322R	30352R
3	USCC3I	30313R	30323R	30353R

Reference Number

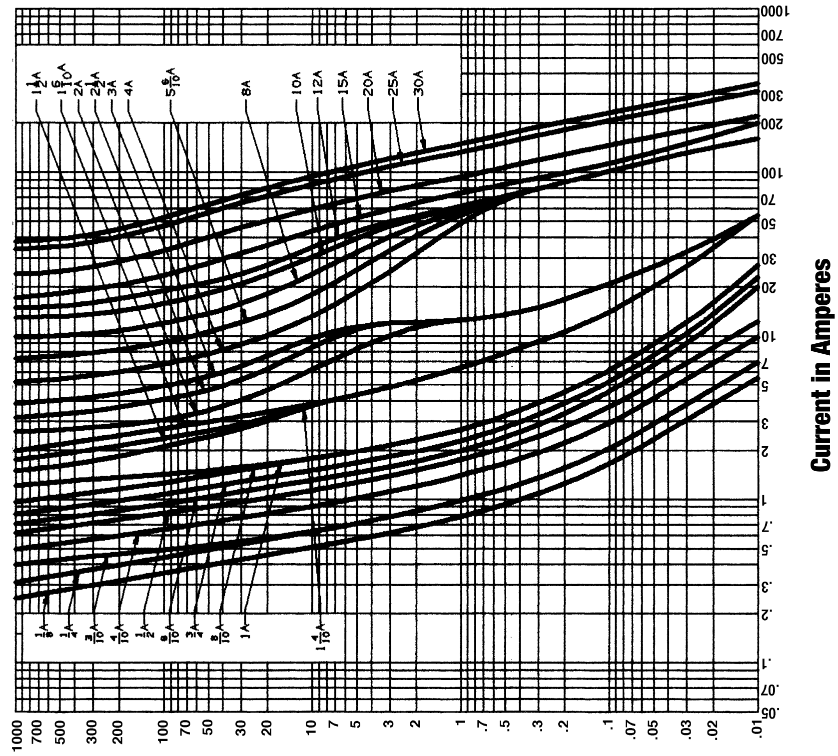
Number of Poles	ULTRASAFE Indicating Fuse Holder	Screw with Double Quick Connects	Pressure Plate with Double Quick Connects	Copper Box Connector
ADDER		W204857	Z217510	N213429
1	X213943	R212397	M218534	G213929
2	D217008	Z212910	Y219579	V214447
3	Y218038	M213428	B222779	X214955

Primary fuses - If primary FLA is less than 2 amps, fuse may be 300% max. (500% for motor control). If primary FLA exceeds 2 amps but is less than 9 amps, fuse may not exceed 167% of primary FLA unless secondary protection is used, when it may be increased to 250%. Fuse sizes shown are based on approx. 40 x FLA for .01 sec.

AMP-TRAP 2000® Class CC Time Delay ATQR

ATQR1/8 to 30

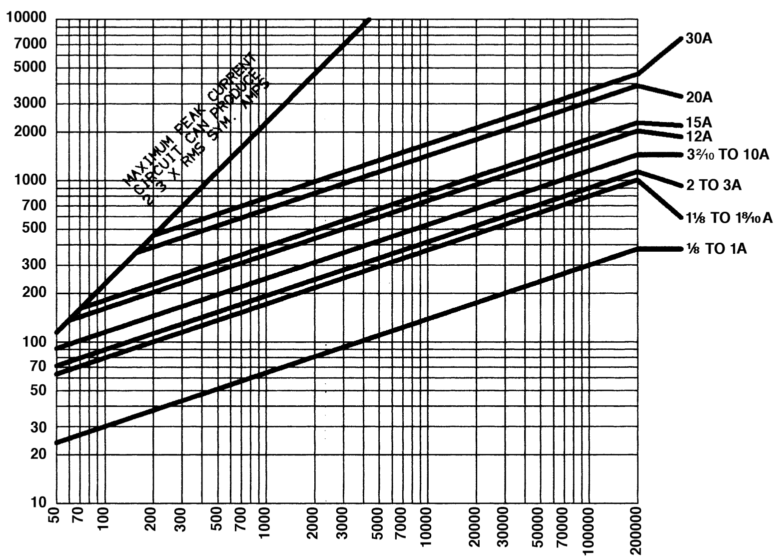
Melting Time – Current Data, 600V Fuses



Time in Seconds

Peak Let-Thru Current Data – ATQR1/8 to 30, 600 Volts AC

Max. Instantaneous Peak Let-Thru Current



Available Current in RMS Sym. Amperes

General Purpose Fuses

North American Power Fuses

TRI-ONIC® Class RK5 Time Delay TR & TRS



THE INDUSTRY'S MOST POPULAR FUSE FOR MOTOR CIRCUIT PROTECTION.

Tri-onic® TR and TRS current limiting time delay fuses are engineered for overcurrent protection of motors and transformers, service entrance equipment, feeder and branch circuits. Tri-onic's proven time delay characteristic safely handles harmless starting currents and inrush currents associated with today's motors and transformers.

Features/Benefits

- ✔ **Time delay** for motor start-ups and transformer inrush currents without nuisance opening
- ✔ **Current limiting** for low peak let-thru current
- ✔ **Rejection-style design** prevents replacement errors (when used with recommended fuse blocks)
- ✔ **Easy-to-read imprint label** for quick recognition and replacement
- ✔ **Metal-embossed date and reference number** for traceability and lasting identification
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial settings
- ✔ **Brass end-caps** (blade-style) for cooler operation and superior performance
- ✔ **High-grade** silica filler ensures fast arc quenching and high current limitation

HIGHLIGHTS:

- ✔ Time Delay
- ✔ Current Limiting
- ✔ AC & DC Rated

APPLICATIONS:

- ✔ Motor Circuits
- ✔ Mains
- ✔ Feeders
- ✔ Branch Circuits
- ✔ Transformers
- ✔ Service Entrance Equipment
- ✔ General-purpose Protection

Ratings

✔ **TR**
AC: 1/10 to 600A
250VAC, 200kA I.R.

DC: 1/10 to 2 8/10A
& 35 to 400A,
250VDC, 20kA I.R.;
3 to 30A & 450 to 600A,
160VDC, 20kA I.R.

✔ **TRS**
AC: 1/10 to 600A
600VAC, 200kA I.R.

DC: 1/10 to 12A,
600VDC, 20kA I.R.;
70 to 600A,
600VDC, 100kA I.R.;
15 to 60A,
300VDC, 20kA I.R.

Approvals

- ✔ UL Listed to Standard 248-12
- ✔ CSA Certified to Standard C22.2 No. 248.12
- ✔ DC Listed to UL Standard 198L

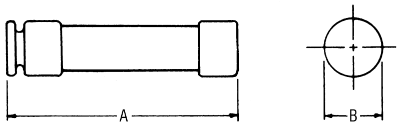
General Purpose Fuses

North American Power Fuses

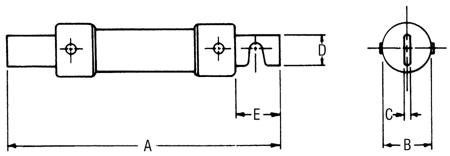
TRI-ONIC® Class RK5 Time Delay TR & TRS

Standard Fuse Ampere Ratings

Ampere Rating	Catalog Number		Reference Number		Ampere Rating	Catalog Number		Reference Number	
	250V	600V	250V	600V		250V	600V	250V	600V
1/10	TR1/10R	TRS1/10R	F222530	W216748	10	TR10R	TRS10R	D200839	N218811
15/100	TR15/100R	TRS15/100R	E201898	F223059	12	TR12R	TRS12R	S201381	B219858
2/10	TR2/10R	TRS2/10R	Z214198	X216749	15	TR15R	TRS15R	D211120	B201389
3/10	TR3/10R	TRS3/10R	C217260	J212160	17-1/2	TR17-1/2R	TRS17-1/2R	S211639	K211126
4/10	TR4/10R	TRS4/10R	Z223053	Y216750	20	TR20R	TRS20R	D214708	P217777
1/2	TR1/2R	TRS1/2R	Y223052	N217776	25	TR25R	TRS25R	G215217	B219329
6/10	TR6/10R	TRS6/10R	R216238	L213197	30	TR30R	TRS30R	F217769	K213196
8/10	TR8/10R	TRS8/10R	T219322	R217779	35	TR35R	TRS35R	F218804	J214207
1	TR1R	TRS1R	Z212151	H212159	40	TR40R	TRS40R	E200840	Q217778
1-1/8	TR1-1/8R	TRS1-1/8R	Q218284	G212158	45	TR45R	TRS45R	F201899	Q218813
1-1/4	TR1-1/4R	TRS1-1/4R	E217768	J211125	50	TR50R	TRS50R	B213188	D201391
1-4/10	TR1-4/10R	TRS1-4/10R	E218803	H213194	60	TR60R	TRS60R	P216742	M214716
1-6/10	TR1-6/10R	TRS1-6/10R	R219320	G214205	70	TR70R	TRS70R	Q219848	Y213691
1-8/10	TR1-8/10R	TRS1-8/10R	S219850	R215732	75	TR75R	TRS75R	E222529	P215730
2	TR2R	TRS2R	J215725	Q222539	80	TR80R	TRS80R	W223050	W216242
2-1/4	TR2-1/4R	TRS2-1/4R	A213187	H214206	90	TR90R	TRS90R	B200837	L217774
2-1/2	TR2-1/2R	TRS2-1/2R	Q212672	J213195	100	TR100R	TRS100R	K216738	D214202
2-8/10	TR2-8/10R	TRS2-8/10R	S213686	S215733	110	TR110R	TRS110R	B218800	K215220
3	TR3R	TRS3R	T219851	P215224	125	TR125R	TRS125R	N219317	N215729
3-2/10	TR3-2/10R	TRS3-2/10R	N216741	N201906	150	TR150R	TRS150R	P219847	S216745
3-1/2	TR3-1/2R	TRS3-1/2R	Q216237	M200847	175	TR175R	TRS175R	D222528	K217773
4	TR4R	TRS4R	A212152	D219860	200	TR200R	TRS200R	V223049	K218808
4-1/2	TR4-1/2R	TRS4-1/2R	G222531	A216246	225	TR225R	TRS225R	A200836	Y219855
5	TR5R	TRS5R	E214709	M211128	250	TR250R	TRS250R	P201378	L222535
5-6/10	TR5-6/10R	TRS5-6/10R	R212673	H223061	300	TR300R	TRS300R	B201895	J200844
6	TR6R	TRS6R	S218286	V215735	350	TR350R	TRS350R	A211117	J201902
6-1/4	TR6-1/4R	TRS6-1/4R	S218286	K212161	400	TR400R	TRS400R	P211636	G211123
7	TR7R	TRS7R	G218805	Z216751	450	TR450R	TRS450R	N218282	E212156
8	TR8R	TRS8R	V219852	R218814	500	TR500R	TRS500R	C218801	W212677
9	TR9R	TRS9R	H222532	S222541	600	TR600R	TRS600R	P219318	F213192



0-60A



61-600A

Dimensions

AMPERE RATING	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
250V-TR FUSES										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-7/8	149	1-1/16	27	1/8	3	3/4	19	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	53	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-TRS FUSES										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

Recommended Fuse Blocks With Box Connectors For Tri-onic® Class RK5 Fuses

Fuse Ampere Rating	Catalog Number 250V		Ref. Number 250V	
	1 Pole	3 pole	1 pole	3 pole
0-30	20306R	20308R	T213411	K215956
31-60	20606R	20608R	B212383	E214939
61-100	21036R	21038R	D201621	M212899
101-200	22001R	22003R	R213915	G214941
201-400	24001R	24003R	J219566	D222022
401-600	2631R	2633R	H214942	P215960

Fuse Ampere Rating	Catalog Number 600V		Ref. Number 600V	
	1 Pole	3 pole	1 pole	3 pole
0-30	60306R	60308R	H212389	K214438
31-60	60606R	60608R	K212391	M214440
61-100	61036R	61038R	W204788	Z211875
101-200	62001R	62003R	V212906	B213924
201-400	64001R	64003R	D219055	M222030
401-600	6631R	6633R	J216990	E218021

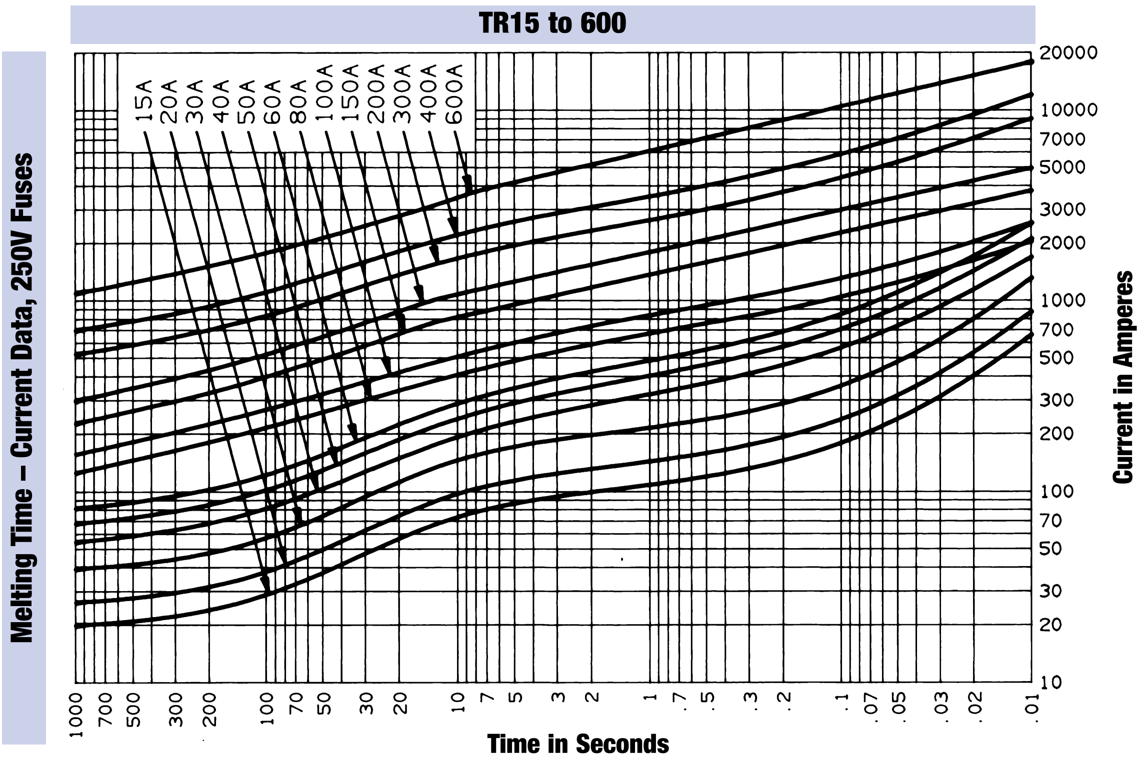
A variety of pole configurations and termination provisions is available.

General Purpose Fuses

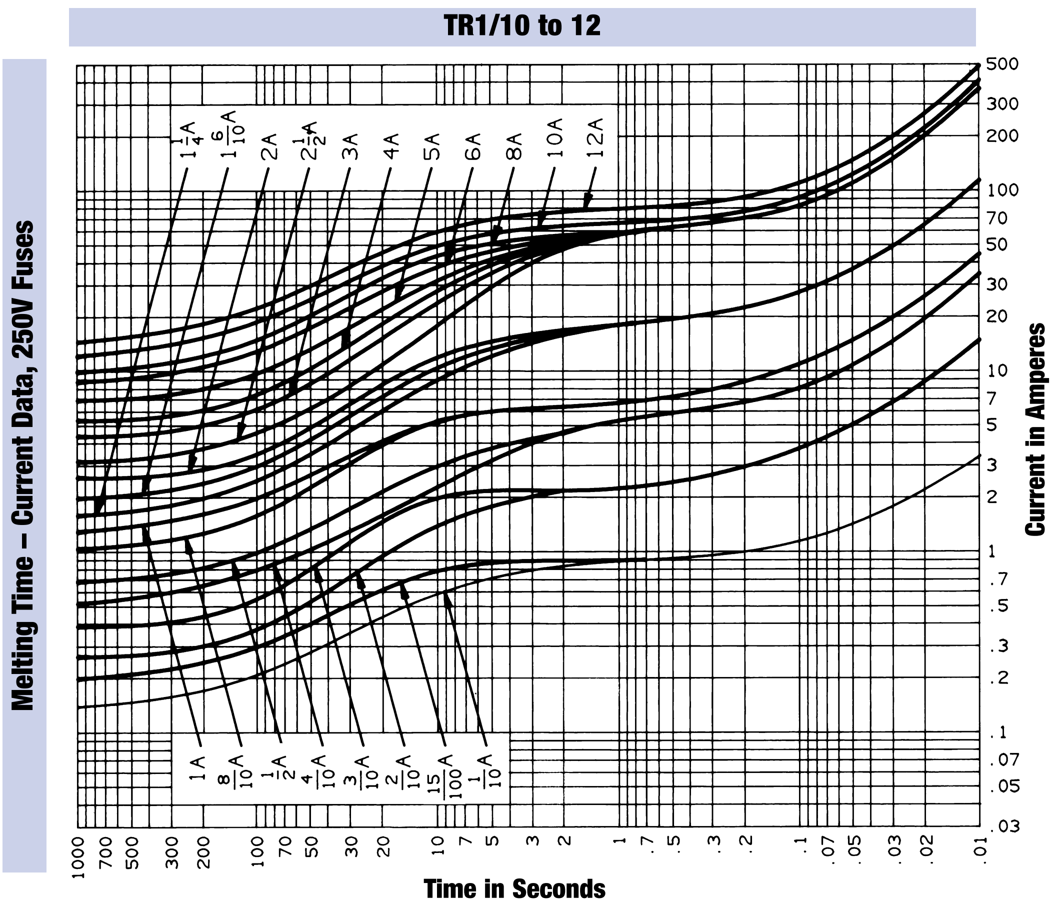
North American Power Fuses

TRI-ONIC® Class RK5 Time Delay TR & TRS

TR15 to 600



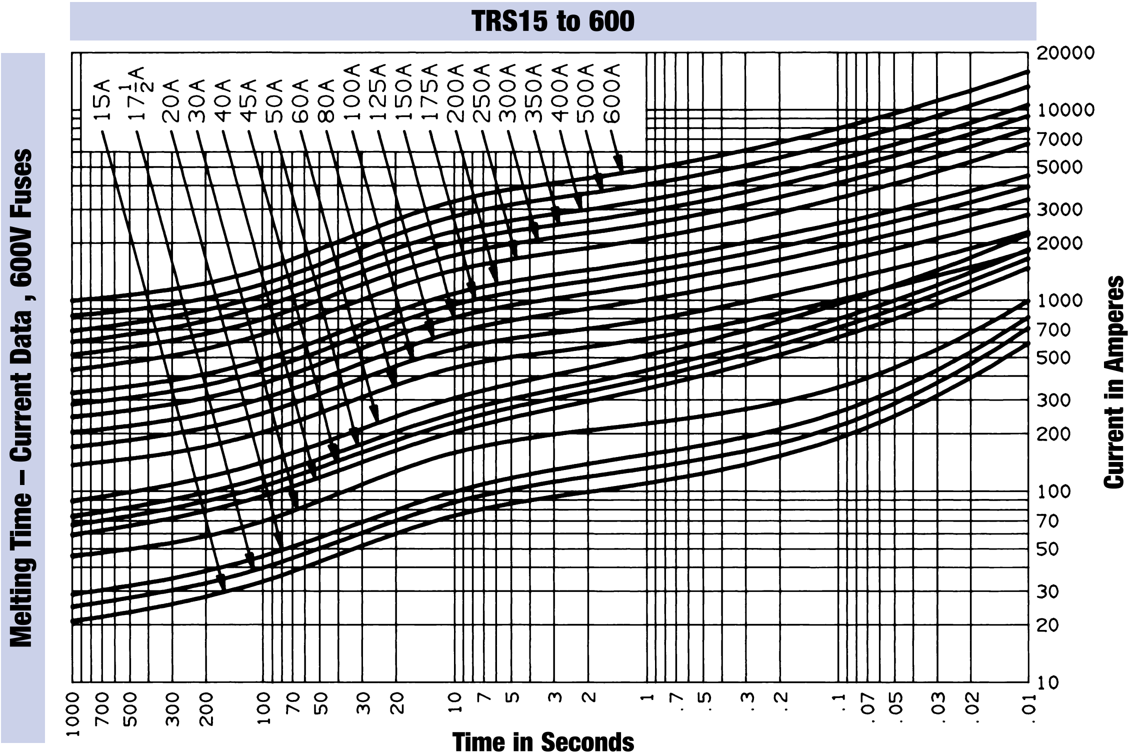
TR1/10 to 12

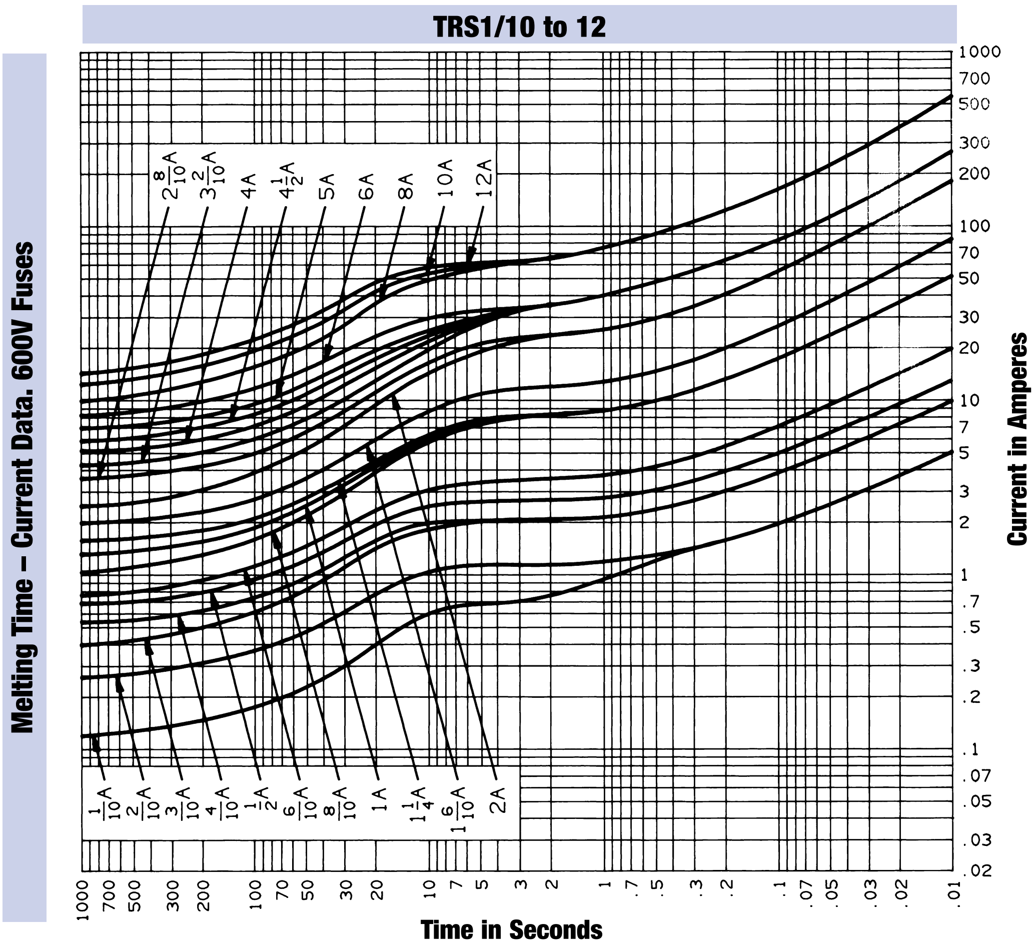


General Purpose Fuses

North American Power Fuses

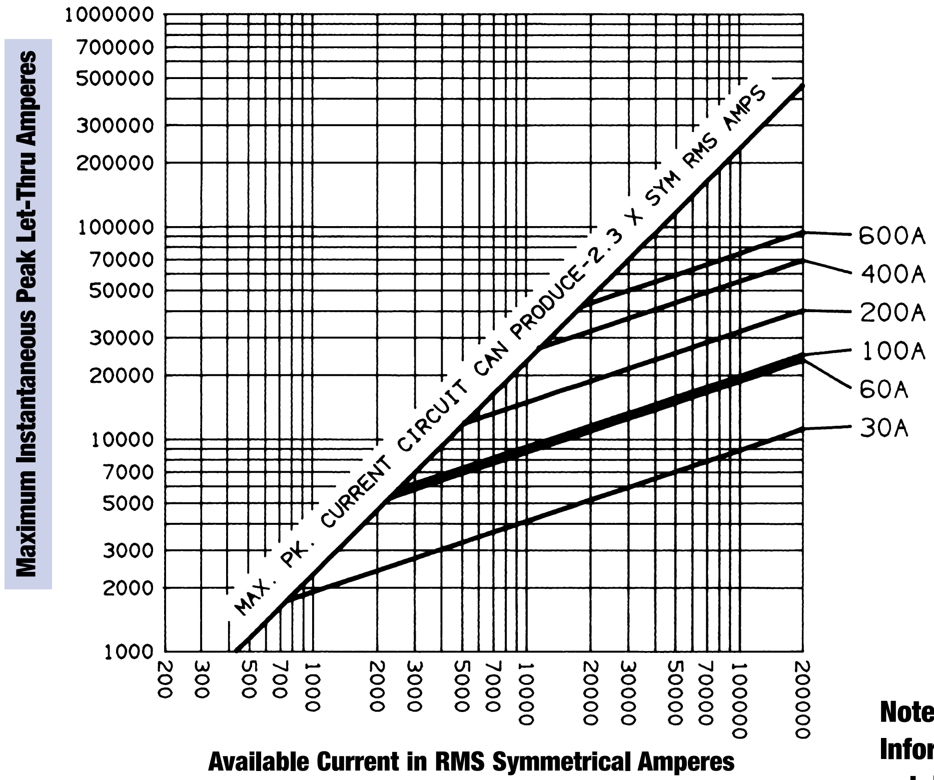
TRI-ONIC®   Class RK5 Time Delay TR & TRS





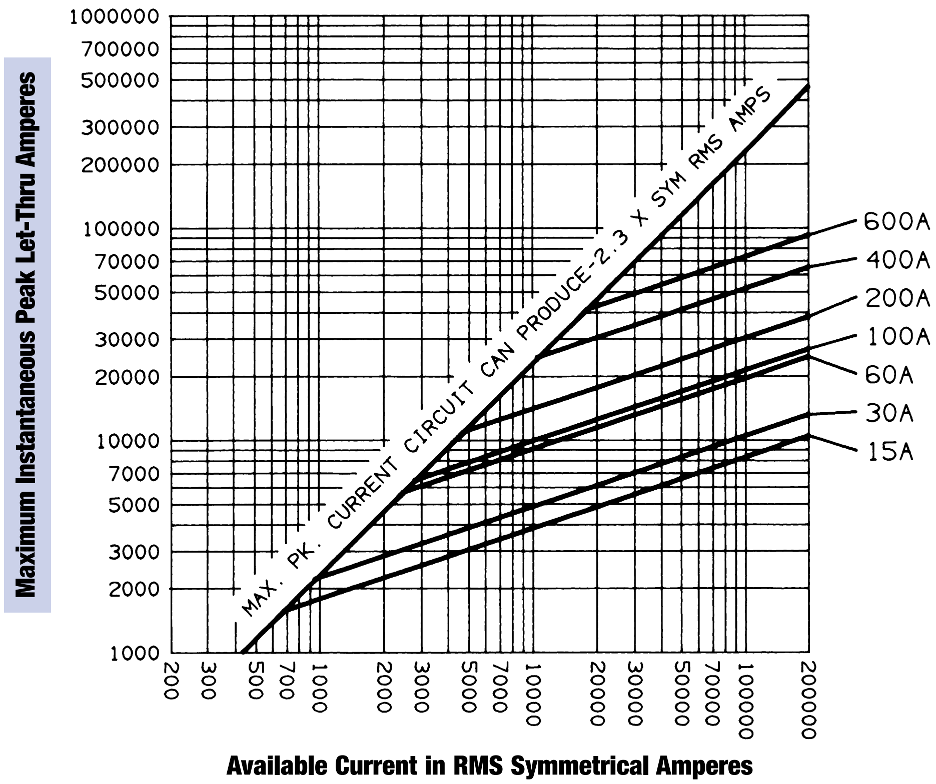
TRI-ONIC® Class RK5 Time Delay TR & TRS

Peak Let-Thru Current Data – TR30 to 600, 250 Volts AC



Note: See Application Information section of this catalog for motor and transformer protection fuse selection guidelines

Peak Let-Thru Current Data – TRS15 to 600, 600 Volts AC



TRI-ONIC® DC Rated Time Delay TRS-RDC



DC RATED FOR TOUGH DC APPLICATIONS

The Tri-onic DC fuse series is designed for DC circuit protection in surface and underground mines. The TRS-RDC is MSHA approved and meets the industry's most severe third party requirements for 600VDC rated fuses.

The TRS-RDC is a time-delay fuse with essentially the same time-current characteristic as the standard Tri-onic.

Features/Benefits

- ✔ **DC rated** for mine duty and other long time-constant applications
- ✔ **Time delay** for motor start-ups and high inrush loads without nuisance opening
- ✔ **Rugged glass melamine body** for superior reliability in harsh environments

HIGHLIGHTS:

- ✔ Time Delay
- ✔ DC Rated

APPLICATIONS:

- ✔ Mine Circuits
- ✔ Trailing Cables
- ✔ Pump Motors
- ✔ Rail Heaters

Ratings

- ✔ **DC:** 1 to 30A 300VDC, 20kA I.R. (Consult Factory for Availability)
- ✔ **DC:** 35 to 400A 600VDC, 20kA I.R.

Approvals

- ✔ MSHA Approval No. 28-26-0

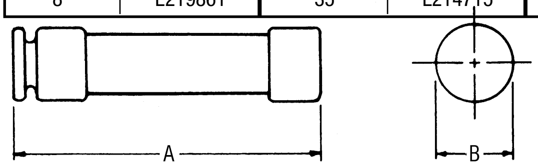
TRI-ONIC® DC Rated Time Delay TRS-RDC

Standard Fuse Ampere Ratings, Catalog Numbers

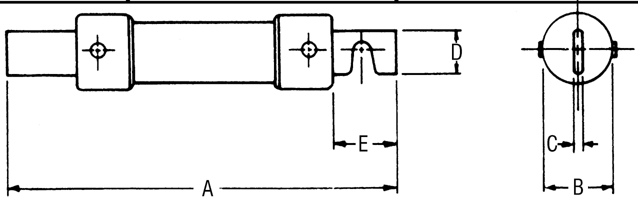
AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER
1	TRS1RDC	10	TRS10RDC	40	TRS40RDC	90	TRS90RDC	200	TRS200RDC
2	TRS2RDC	12	TRS12RDC	45	TRS45RDC	100	TRS100RDC	250	TRS250RDC
3	TRS3RDC	15	TRS15RDC	50	TRS50RDC	125	TRS125RDC	300	TRS300RDC
5	TRS5RDC	20	TRS20RDC	60	TRS60RDC	150	TRS150RDC	400	TRS400RDC
6	TRS6RDC	30	TRS30RDC	70	TRS70RDC	175	TRS175RDC		
8	TRS8RDC	35	TRS35RDC	80	TRS80RDC				

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER
1	Z212680	10	A219328	40	B218294	90	X218290	200	X219325
2	G223060	12	P222538	45	C219330	100	G214711	250	D223057
3	T215734	15	M201905	50	P201907	125	V216241	300	Y201386
5	D211649	20	P218812	60	Q215225	150	G217264	400	Y211644
6	B216247	30	C213695	70	E214203	175	W218289		
8	E219861	35	L214715	80	H217265				



31-60 Amperes

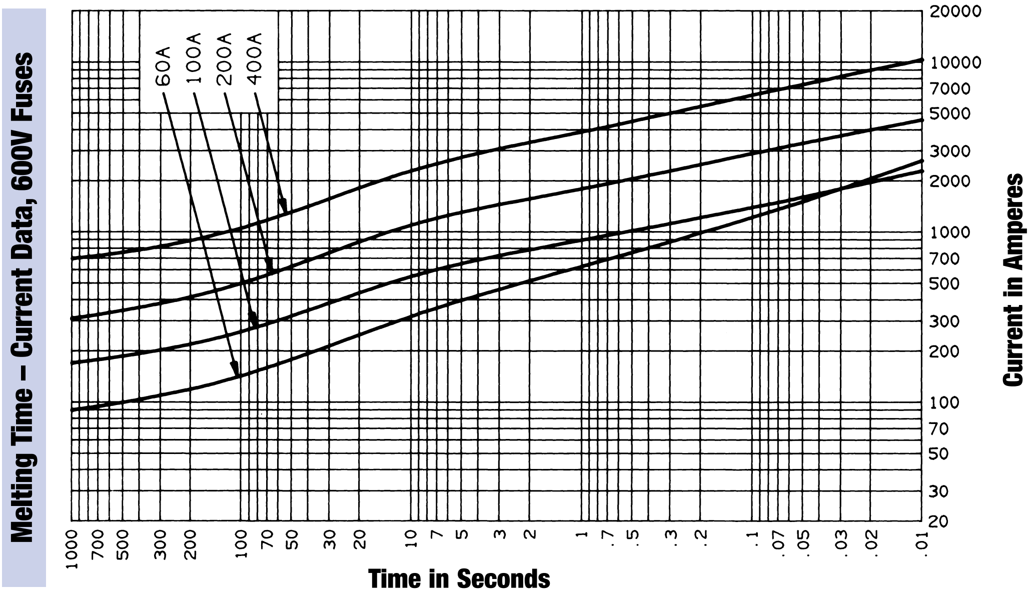


61-400 Amperes

Dimensions

AMPERE RATING	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
1-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48

TRS-RDC60 to 400



AMP-TRAP® Class J Fast Acting A4J



FOR EXCELLENT CURRENT LIMITING PROTECTION

A4J Class J fuses deliver excellent current-limiting protection to a wide variety of applications. Their unique dimensions prevent the substitution of other fuses with lower voltage ratings, interrupting ratings, or current-limiting capability.

Features/Benefits

- ✔ **High current limitation** for low peak let-thru current
- ✔ **Unique dimensions** prevent replacement by other fuse classes
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial environments
- ✔ **Easy-to-read imprint label** for quick recognition and replacement

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Very Current-Limiting
- ✔ DC Ratings

APPLICATIONS:

- ✔ Capacitors
- ✔ Loadcenters
- ✔ Panelboards
- ✔ Switchboards
- ✔ Bus Duct
- ✔ Feeder Circuits
- ✔ Circuit Breakers
- ✔ Lighting, Heating, and General Loads

Ratings

- ✔ **AC**: 1 to 600A 600VAC, 200kA I.R.
- ✔ **DC:** 1 to 600A 300VDC, 20kA I.R.

Approvals

- ✔ UL Listed to Standard 248-8.
- ✔ CSA Certified to Standard C22.2 No. 248.8
- ✔ DC Tested to UL 198L limits
- ✔ IEC 269-2-1

General Purpose Fuses

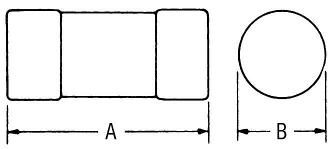
North American Power Fuses

AMP TRAP®

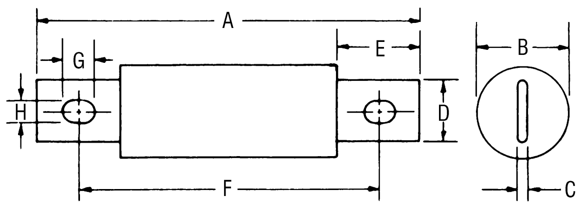
Class J Fast Acting A4J

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG. NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER
1	A4J1	V217299	45	A4J45	J201419	175	A4J175	Q212189
3	A4J3	J219888	50	A4J50	X201937	200	A4J200	G212710
6	A4J6	T211157	60	A4J60	M211680	225	A4J225	X215254
10	A4J10	Z217809	70	A4J70	H212711	250	A4J250	T217298
15	A4J15	K218325	80	A4J80	J213724	300	A4J300	K219360
20	A4J20	X218842	90	A4J90	R214237	350	A4J350	H219887
25	A4J25	L219361	100	A4J100	N223089	400	A4J400	Z222570
30	A4J30	A222571	110	A4J110	V200877	450	A4J450	W200878
35	A4J35	Q223091	125	A4J125	V201935	500	A4J500	W201936
40	A4J40	X200879	150	A4J150	R211155	600	A4J600	S211156



1-60A



70-600A

Recommended Fuse Blocks With Box Connectors for Amp-trap Class J Fuses

Fuse Ampere Rating	600V OR LESS			
	1 Pole		3 pole	
	Cat N°	Ref N°	Cat N°	Ref N°
0-30	60306J	J211884	60308J	A214452
	US3J1	E212409	US3J3	J214460
31-60	60606J	L211886	60608J	F212916
	US6J1	M219592	US6J3	V205017
61-100	61036J	Z201640	61038J	G212917
101-200	62001J	D214455	62003J	E214962
201-400	64031J	X218543	64033J	S219068
401-600	6631J	P201125	6633J	A201641

A variety of pole configurations and termination provisions is available. Refer to the fuse block section of this catalog for details.

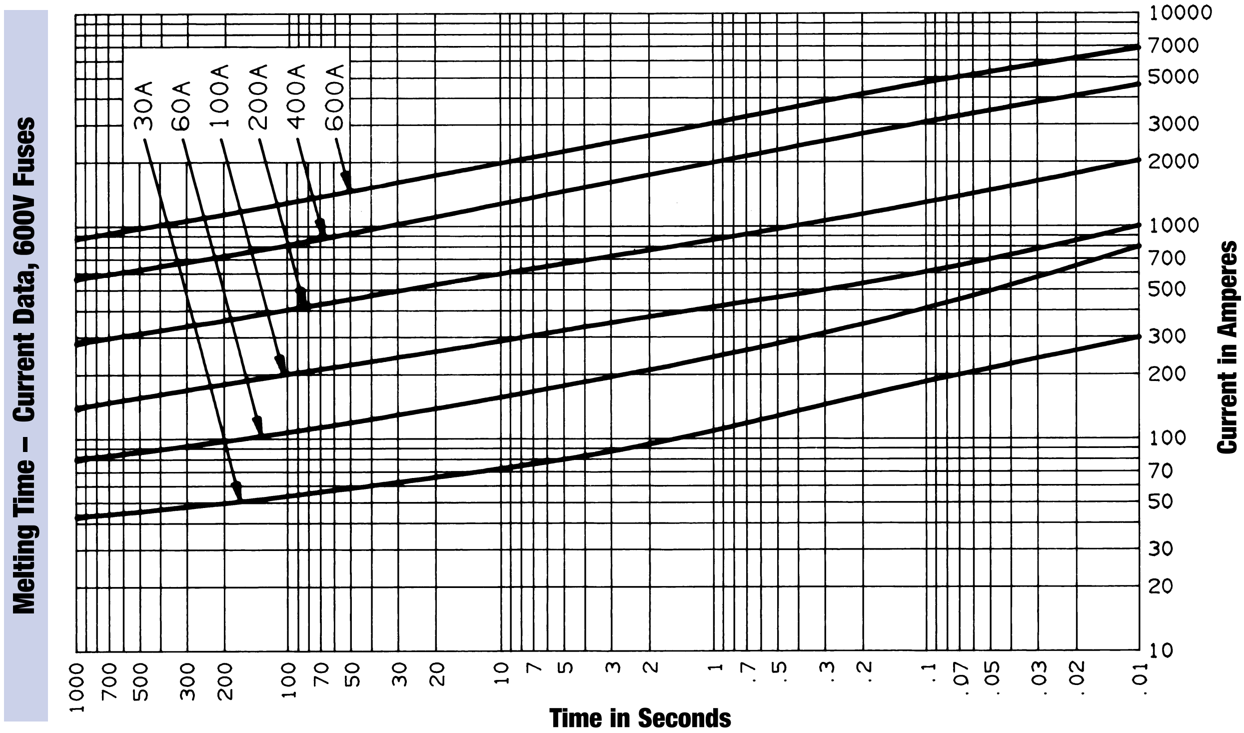
Dimensions

AMPERE RATING	A		B		C		D		E		F		G		H	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
1-30	2-1/4	57	13/16	21	-	-	-	-	-	-	-	-	-	-	-	-
31-60	2-3/8	60	1-1/16	27	-	-	-	-	-	-	-	-	-	-	-	-
61-100	4-5/8	117	1-1/8	29	1/8	3.2	3/4	19	1	25	3-5/8	92	3/8	10	9/32	7
101-200	5-3/4	146	1-5/8	41	3/16	4.8	1-1/8	29	1-3/8	35	4-3/8	111	3/8	10	9/32	7
201-400	7-1/8	181	2-1/8	54	1/4	6.3	1-5/8	41	1-7/8	48	5-1/4	133	17/32	13	13/32	10
401-600	8	203	2-1/2	64	3/8	9.5	2	51	2-1/8	54	6	152	11/16	18	17/32	13

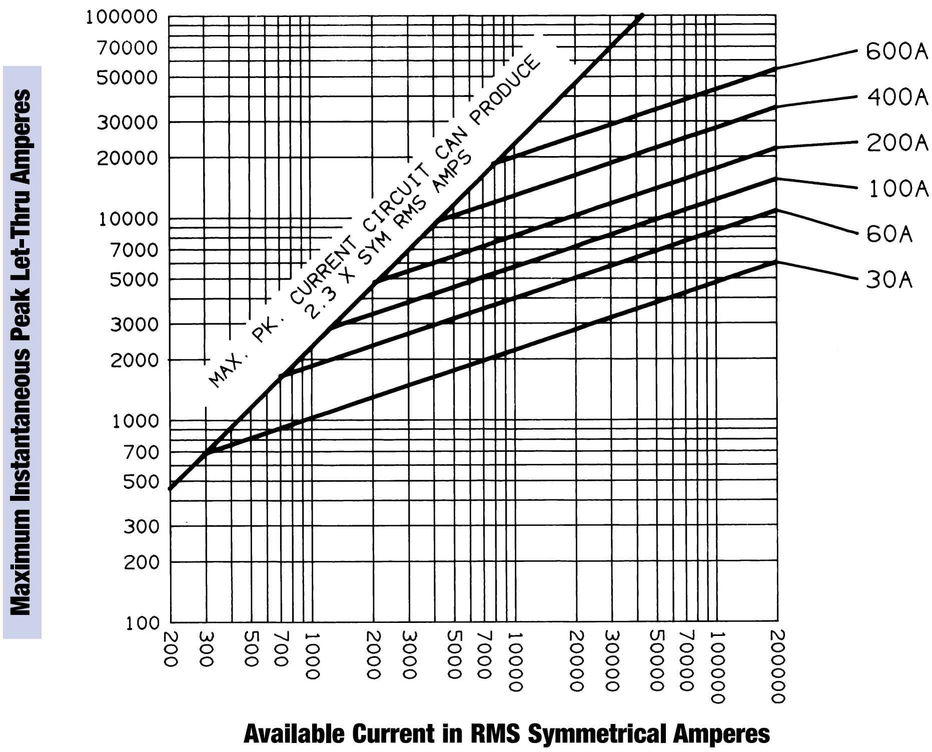
AMP-TRAP®

Class J Fast Acting A4J

A4J30 to 600



Peak Let-Thru Current Data – 30 to 600, 600 Volts AC



AMP-TRAP®

Class L A4BY



COUNT ON THE HIGH INTERRUPTING RATING OF OUR MOST WIDELY-USED CLASS L FUSE

When it comes to protecting service entrance equipment, feeder circuits, and circuit breakers, A4BY fuses have been the industry's favorite. The A4BY is a 100% rated device and may be applied at continuous currents up to its ampere rating. A 4-second minimum time delay at 500% rating allows the A4BY to pass normal current surges and to coordinate with ground fault relays.

Features / Benefits

- ✔ **Unique dimensions** prevent replacement by other fuse classes
- ✔ **Blade stamped reference numbers** for permanent identification
- ✔ **Glass melamine body and plated terminals** provide superior reliability in harsh environments

HIGHLIGHTS:

- ✔ Current-Limiting
- ✔ 4-Second Time Delay
- ✔ DC Ratings
- ✔ Uniform Characteristics in all Ampere Ratings

APPLICATIONS:

- ✔ Mains, Feeders
- ✔ Circuit Breakers
- ✔ Loadcenters
- ✔ Panelboards
- ✔ Switchboards
- ✔ Metering Centers

Ratings

- ✔ **AC:** 200 to 6,000A 600VAC,200kA I.R.
- ✔ **DC:** 200 to 2500A 300VDC, 100kA I.R.

Approvals

- ✔ UL Listed to Standard 248-10
- ✔ CSA Certified to Standard C22.2 No. 248.10
- ✔ DC Tested to UL 198L limits
- ✔ IEC 269-2-1

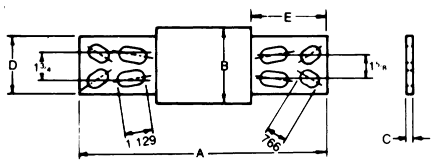
Indicators
Optional built-in fuse indicators (-TI) are available for visual indication of open fuse condition. Ask sales agent.

AMP-TRAP® Class L A4BY

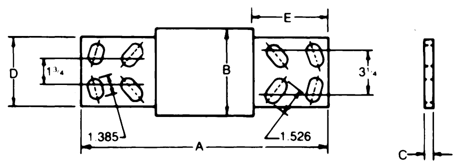
Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	AMPERE RATING	CATALOG NUMBER	REF. NUMBER
200*	A4BY200	P217823	801	A4BY801	K211172	2000	A4BY2000	A218339
250*	A4BY250	P222584	900	A4BY900	C211694	2001	A4BY2001	M218856
300*	A4BY300	J201948	1000	A4BY1000	X201431	2500	A4BY2500	L200892
350*	A4BY350	Y212725	1100	A4BY1100	H211170	3000	A4BY3000	J211171
400*	A4BY400	Z213738	1200	A4BY1200	A211692	3001	A4BY3001	H212205
500*	A4BY500	T216286	1201	A4BY1201	X212724	3500	A4BY3500	H213240
600*	A4BY600	Q217824	1350	A4BY1350	G213239	4000	A4BY4000	G214251
601	A4BY601	C219376	1400	A4BY1400	Y213737	4001	A4BY4001	J214759
650	A4BY650	Z219902	1500	A4BY1500	H214758	5000	A4BY5000	V216793
700	A4BY700	Q222585	1600	A4BY1600	L215267	6000	A4BY6000	N218857
750	A4BY750	M200893	1601	A4BY1601	T216792			
800	A4BY800	Z201433	1800	A4BY1800	K217313			

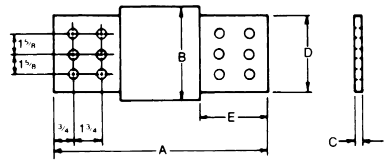
* Not UL Listed or CSA Certified



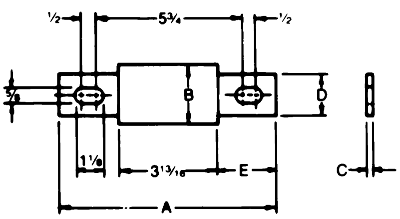
2001-3000A



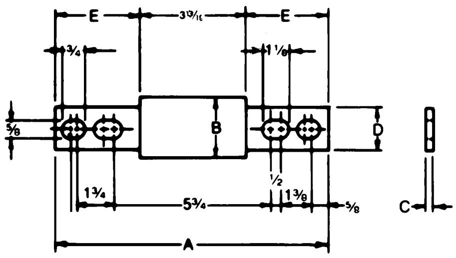
3001-4000A



4001-6000A



200-800A



801-2000A

Dimensions

AMPERE RATING	A In.	A mm	B In.	B mm	C In.	C mm	D In.	D mm	E In.	E mm
200-600*	8-5/8	219	2	51	5/16	8	1-5/8	41	2-13/32	61
601-800	8-5/8	219	2-1/2	63	3/8	9	2	51	2-13/32	61
801-1200	10-3/4	273	2-1/2	63	3/8	9	2	51	3-15/32	88
1201-1600	10-3/4	273	3	76	7/16	11	2-3/8	60	3-15/32	88
1601-2000	10-3/4	273	3-1/2	89	1/2	13	2-3/4	70	3-15/32	88
2001-2500	10-3/4	273	4-1/2	114	3/4	19	3-1/2	89	3-15/32	88
2501-3000	10-3/4	273	5	127	3/4	19	4	102	3-15/32	88
3001-4000	10-3/4	273	5-3/4	146	3/4	19	4-3/4	121	3-15/32	88
4001-5000	10-3/4	273	6-1/4	159	1	25	5-1/4	133	3-15/32	88
5001-6000	10-3/4	273	7-1/8	181	1	25	5-3/4	146	3-15/32	88

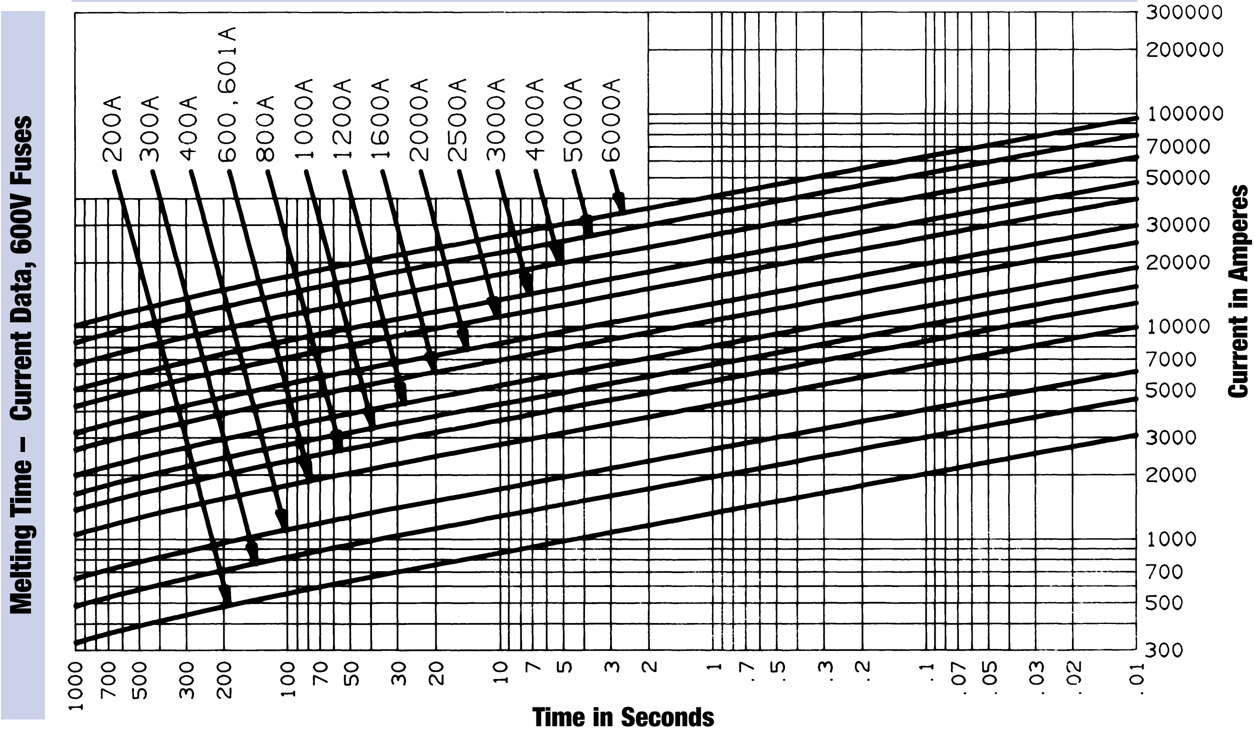
* Not UL Listed or CSA Certified

Safety Note: Class L fuses are dimensioned for one-way interchangeability.
A Class L fuse of any lower ampere rating can be substituted for a given Class L fuse.

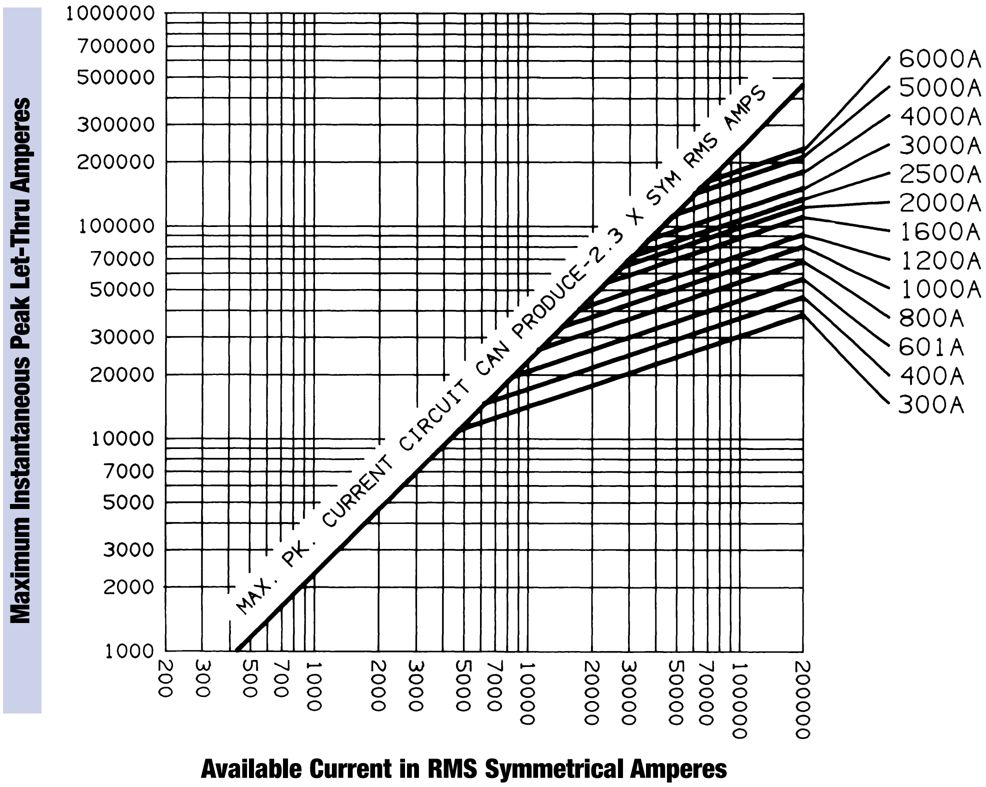
AMP-TRAP®

Class L A4BY

A4BY200 to 6000



Peak Let-Thru Current Data – A4BY300 to 6000, 600 Volts AC



AMP-TRAP®

Class L Time Delay A4BT



WHEN YOUR HEAVIER LOADS NEED PROTECTION, A4BT FUSES WON'T LET YOU DOWN

The high interrupting rating of A4BT current limiting fuses is ideally suited for protecting mains, feeders, and general circuits. The 10-second time delay at 500% of fuse rating is ideal for large motors and other loads with a high inrush. A4BT fuses are suitable for DC applications up to 500VDC. An A4BT fuse can be applied to normal loads up to its full ampere rating to allow 100% rating of equipment.

Features / Benefits

- ✔ **Unique dimensions** prevent replacement by other fuse classes.
- ✔ **Blade-stamped catalog numbers** for permanent identification
- ✔ **Glass melamine body and plated terminals** provide superior reliability in harsh environments

HIGHLIGHTS:

- ✔ Current-Limiting
- ✔ Full 10-Second Delay
- ✔ DC Ratings
- ✔ Uniform Characteristics in all Ampere Ratings

APPLICATIONS:

- ✔ Motors
- ✔ Motor Controllers
- ✔ Transformers
- ✔ Mains
- ✔ Feeders

Ratings

- ✔ **AC:** 200 to 2,000A 600VAC, 200kA I.R.
- ✔ **DC:** 200 to 2,000A 500VDC, 100kA I.R.

Approvals

- ✔ UL Listed to Standard 248-10
- ✔ CSA Certified to Standard C22.2 No. 248.10
- ✔ DC Tested to UL 198L limits

General Purpose Fuses

North American Power Fuses

AMP-TRAP®

Class L Time Delay A4BT

Standard Fuse Ampere Ratings, Catalog Numbers

AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER
200	A4BT200	601	A4BT601	1100	A4BT1100
250	A4BT250	650	A4BT650	1200	A4BT1200
300	A4BT300	700	A4BT700	1400	A4BT1400
350	A4BT350	750	A4BT750	1500	A4BT1500
400	A4BT400	800	A4BT800	1600	A4BT1600
500	A4BT500	900	A4BT900	1800	A4BT1800
600	A4BT600	1000	A4BT1000	2000	A4BT2000

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER
200	W212723	601	Z218338	1100	J200890
250	E214249	650	L218855	1200	W201430
300	G214757	700	A219374	1400	G201946
350	L215773	750	X219900	1500	G211169
400	R216284	800	N222583	1600	Z211691
500	J217312	900	K200891	1800	F212203
600	N217822	1000	M222582	2000	F213238

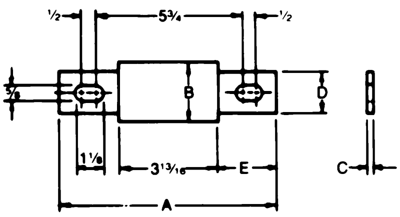
Three Phase Motor Fuse Selection

460 Volt Three Phase Motors

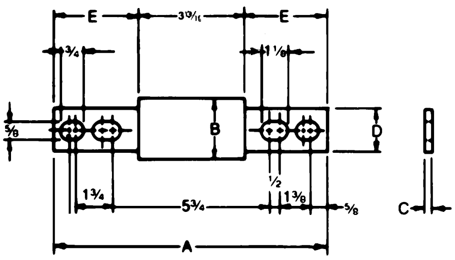
Motor HP	Full Load Amperes at 460V	Recommended A4BT Ampere Rating — Motor Acceleration Times: Typical 5 seconds	Heavy Load Over 5 seconds
300	360	601	700
400	477	800	1000
500	590	1000	1200

575 Volt Three Phase Motors

Motor HP	Full Load Amperes	Typical 5 seconds	Heavy Load Over 5 seconds
400	382	601	700
500	472	700	1000



200-800A



801-2000A

Dimensions

AMPERE RATING	A In.	A mm	B In.	B mm	C In.	C mm	D In.	D mm	E In.	E mm
200-600*	8-5/8	219	2	51	5/16	8	1-5/8	41	2-13/32	61
601-800	8-5/8	219	2-1/2	63	3/8	9	2	51	2-13/32	61
801-1200	10-3/4	273	2-1/2	63	3/8	9	2	51	3-15/32	88
1201-1600	10-3/4	273	3	76	7/16	11	2-3/8	60	3-15/32	88
1601-2000	10-3/4	273	3-1/2	89	1/2	13	2-3/4	70	3-15/32	88

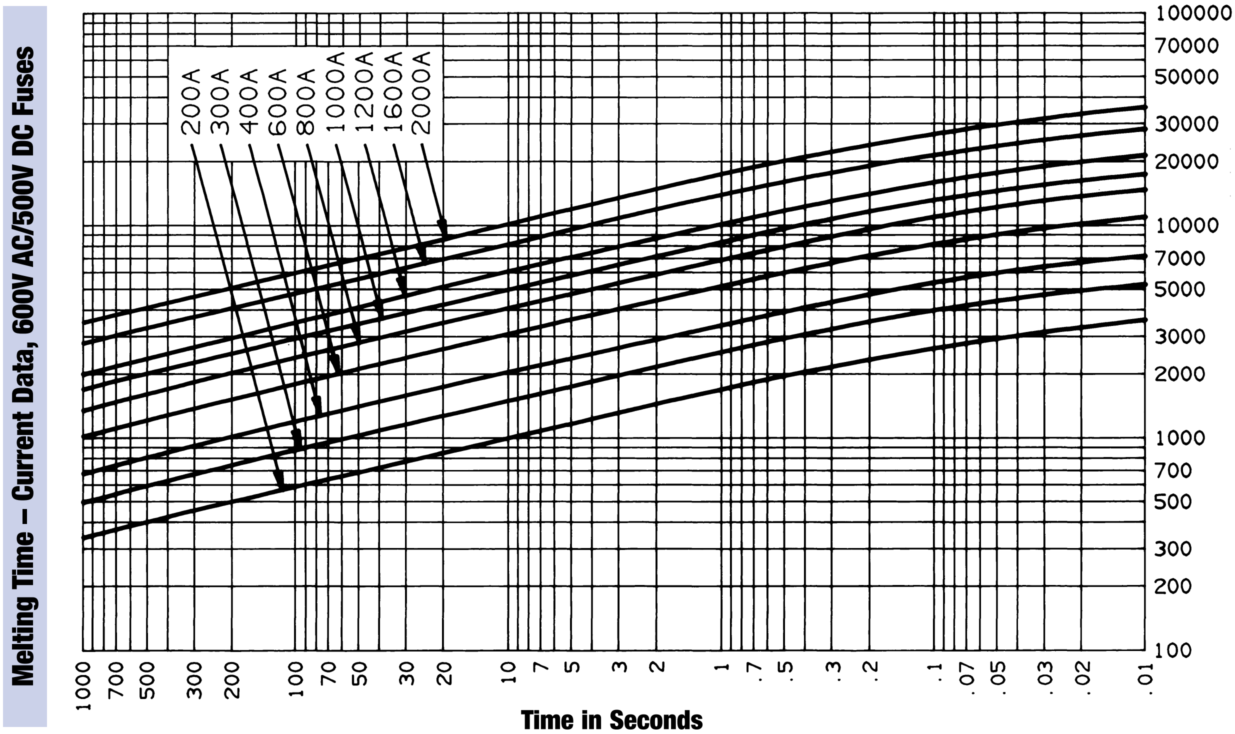
* Not UL Listed or CSA Certified

Safety Note: Class L fuses are dimensioned for one-way interchangeability.
A Class L fuse of any lower ampere rating can be substituted for a given Class L fuse.

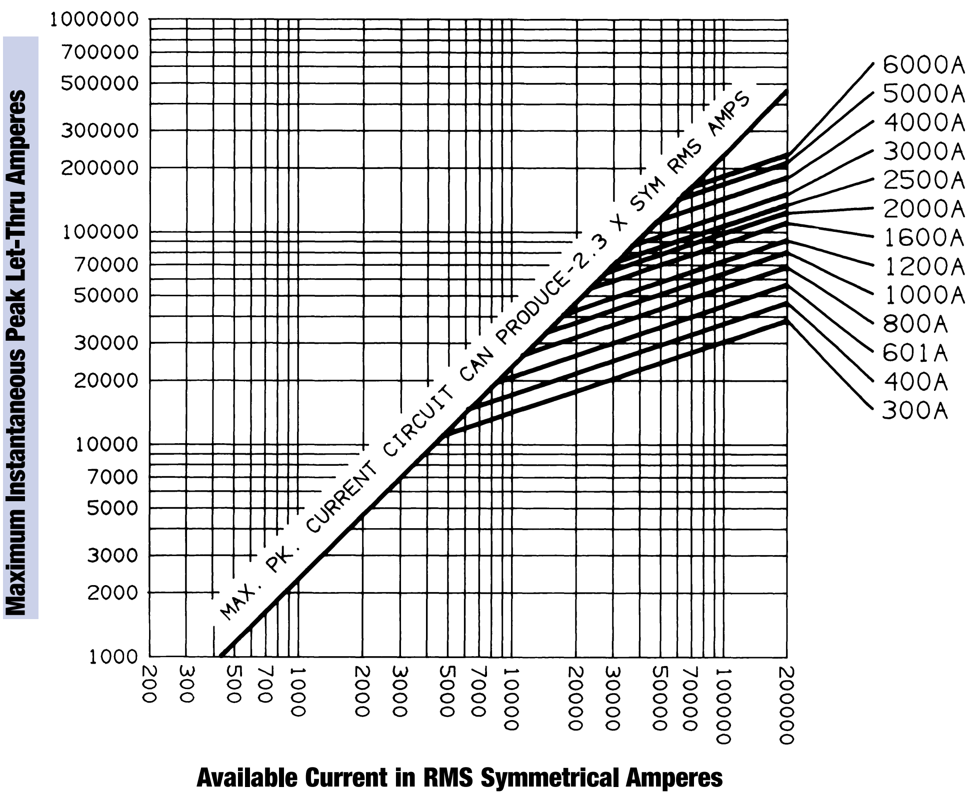
AMP-TRAP®

Class L Time Delay A4BT

A4BT200 to 2000



Peak Let-Thru Current Data – A4BT300 to 2000, 600 Volts AC



General Purpose Fuses

North American Power Fuses

AMP-TRAP®

Class T Fast Acting A3T & A6T



THESE SMALL DIMENSION FUSES ARE THE RIGHT FIT... FOR A TIGHT FIT

Fast acting A3T and A6T Class T fuses combine two highly desirable features -- high current limitation and a small physical size. Their unique dimensions prevent the substitution of other fuses with lower voltage ratings or current limiting capability. These fuses have glass melamine bodies for superior dimensional stability and reference numbers stamped into the blades for permanent identification.

Features / Benefits

- ✔ **Extremely current limiting** for low peak let-thru current
- ✔ **Unique dimensions** prevent replacement by other fuse classes
- ✔ **Blade-stamped reference numbers** for permanent identification
- ✔ **Small physical size** for greater design flexibility

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Extremely Current Limiting
- ✔ Small Physical Size
- ✔ DC Ratings

APPLICATIONS:

- ✔ Loadcenters
- ✔ Panelboards
- ✔ Switchboards
- ✔ Circuit Breakers
- ✔ Metering Centers

Ratings

- ✔ **A3T**
  AC:1 to 1200A
  300VAC,
  200kA I.R.
  DC: 1 to 1200A
  160VDC, 50kA I.R.
- ✔ **A6T**
  AC: 1 to 800A
  600VAC,
  200kA I.R.
  DC: 1 to 800A
  300VDC, 100kA I.R.

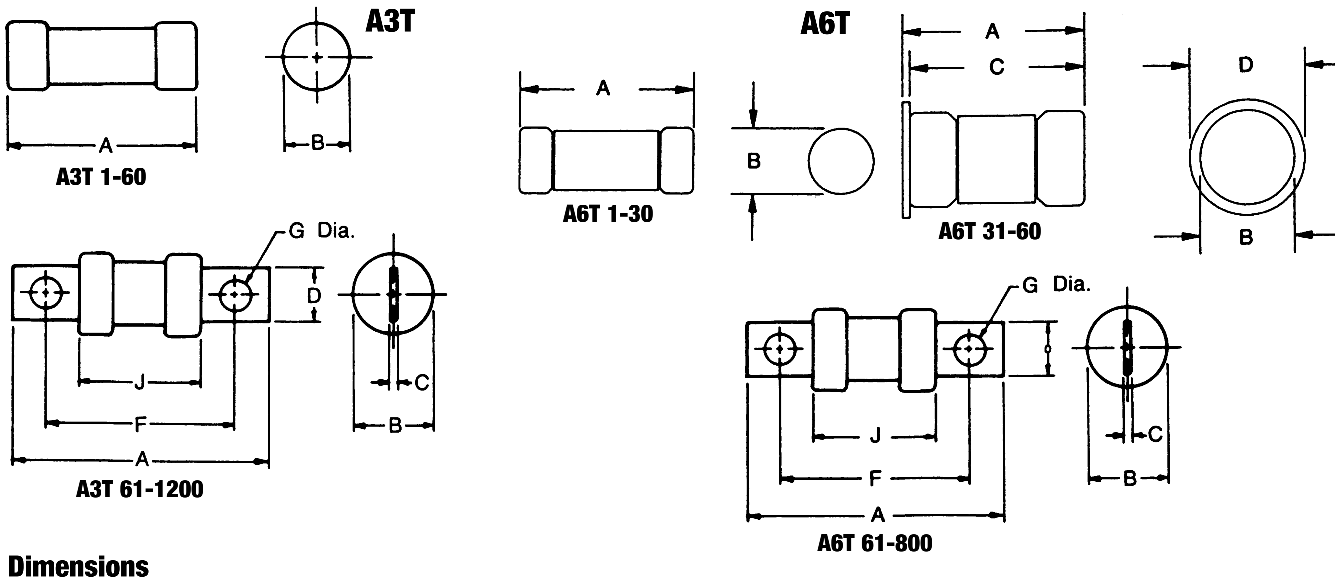
Approvals

- ✔ UL Listed to Standard 248-15
- ✔ CSA Certified to Standard C22.2 No. 248.15
- ✔ DC Tested to UL Standard 198L

AMP-TRAP® Class T Fast Acting A3T & A6T

Standard Fuse Ampere Ratings

Ampere Rating	Catalog Number 300V	Catalog Number 600V	Reference Number 300V	Reference Number 600v	Ampere Rating	Catalog Number 300V	Catalog Number 600V	Reference Number 300V	Reference Number 600V
1	A3T1	A6T1	Q212212	L219384	110	A3T110	A6T110	G218345	K219383
3	A3T3	A6T3	R214766	H201441	125	A3T125	A6T125	H219381	F219908
6	A3T6	A6T6	Y217831	S213249	150	A3T150	A6T150	D219906	Y222592
10	A3T10	A6T10	E212731	G219909	175	A3T175	A6T175	W222590	N223112
15	A3T15	A6T15	Q213247	Z222593	200	A3T200	A6T200	L223110	V200900
20	A3T20	A6T20	G213745	P223113	225	A3T225	A6T225	S200898	G201440
25	A3T25	A6T25	P214258	W200901	250	A3T250	A6T250	E201438	Q201954
30	A3T30	A6T30	V215275	R201955	300	A3T300	A6T300	N201952	S211179
35	A3T35	A6T35	W215782	T211180	350	A3T350	A6T350	Q211177	K211701
40	A3T40	A6T40	B216293	L211702	400	A3T400	A6T400	H211699	R212213
45	A3T45	A6T45	C216800	S212214	450	A3T450	A6T450	P212211	F212732
50	A3T50	A6T50	T217321	G212733	500	A3T500	A6T500	D212730	R213248
60	A3T60	A6T60	J218347	J213747	600	A3T600	A6T600	P213246	H213746
70	A3T70	A6T70	F213744	Q214259	700	A3T700	A6T700	N214257	S214767
80	A3T80	A6T80	Q214765	W215276	800	A3T800	A6T800	T215274	D216801
90	A3T90	A6T90	V215781	V217322	1000	A3T1000	-	W217829	-
100	A3T100	A6T90	R217319	V217322	1200	A3T1000	-	W217829	-

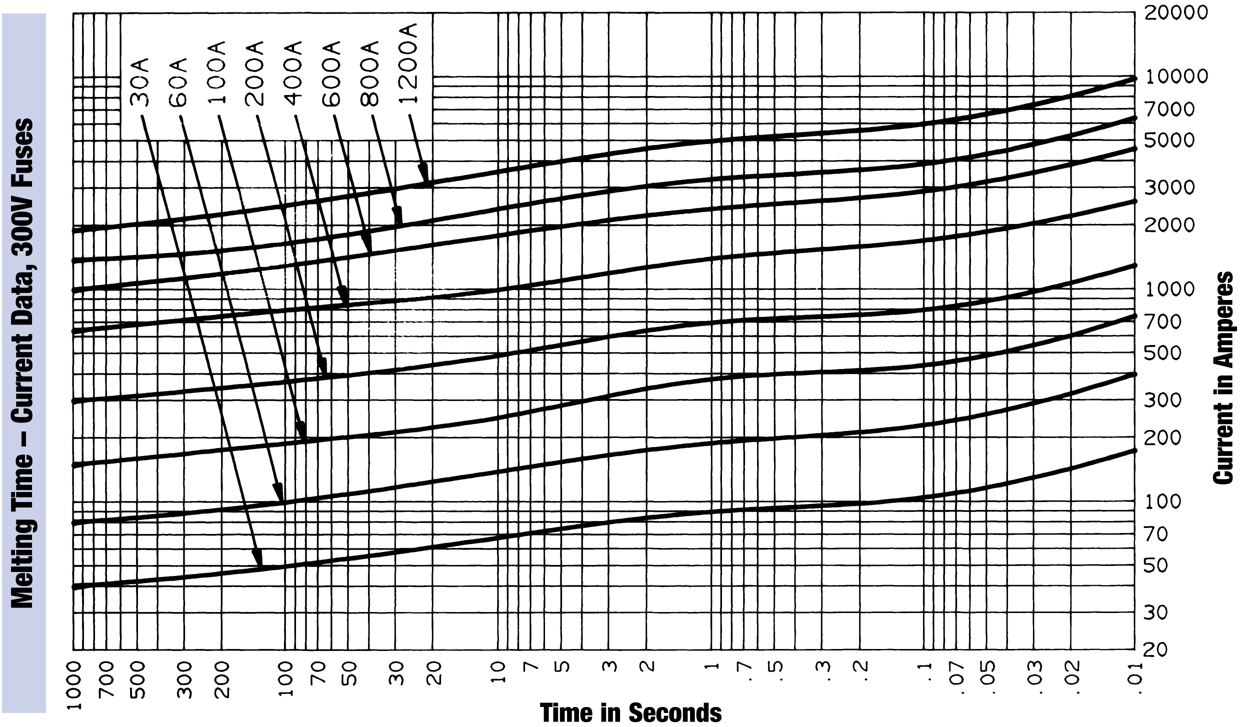


Dimensions

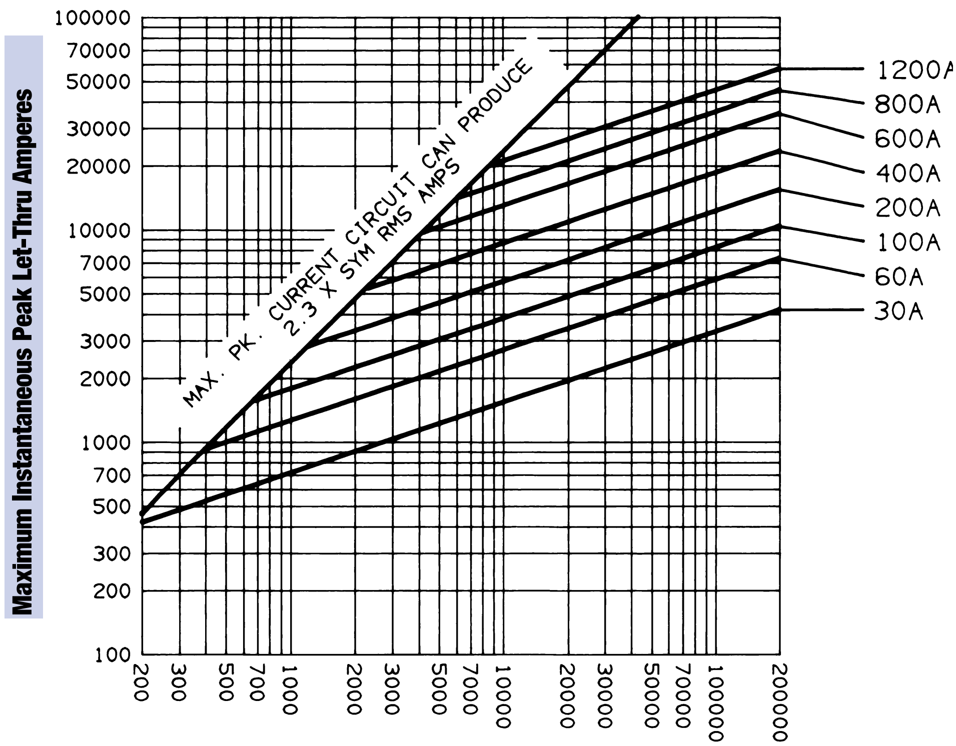
AMPERE RATING	A In.	A mm	B In.	B mm	C In.	C mm	D In.	D mm	F In.	F mm	G In.	G mm	J In.	J mm
A3T														
1-30	.88	22.4	.41	10.3	-	-	-	-	-	-	-	-	-	-
31-60	.88	22.4	.56	14.1	-	-	-	-	-	-	-	-	-	-
61-100	2.16	54.9	.81	20.6	.12	3.2	.75	19.0	1.56	39.6	.28	7.1	.82	20.8
101-200	2.44	62.0	1.06	26.9	.19	4.8	.88	22.4	1.70	43.2	.34	8.6	.83	21.1
201-400	2.75	69.8	1.33	33.8	.25	6.4	1.00	25.4	1.84	46.7	.41	10.4	.84	21.3
401-600	3.06	77.7	1.62	41.1	.31	7.8	1.25	31.8	2.03	51.6	.48	12.2	.84	21.3
601-800	3.38	85.8	2.08	52.8	.38	9.7	1.75	44.4	2.22	56.4	.55	14.0	.88	22.4
801-1200	4.00	102	2.52	64.0	.44	11.2	2.00	50.8	2.53	64.3	.61	15.5	1.03	26.2
A6T														
1-30	1.50	38.1	.57	14.5	-	-	-	-	-	-	-	-	-	-
31-60	1.57	39.9	.81	20.6	1.51	38.4	1.00	25.4	-	-	-	-	-	-
61-100	2.95	75.0	.82	20.8	.12	3.2	.75	19.0	2.35	59.7	.28	7.1	1.58	40.1
101-200	3.26	82.8	1.07	27.2	.19	4.8	.88	22.4	2.51	63.7	.34	8.6	1.61	41.0
201-400	3.62	92.1	1.62	41.3	.25	6.4	1.00	25.4	2.72	69.1	.41	10.4	1.70	43.2
401-600	3.98	101.2	2.06	52.4	.31	7.9	1.25	31.8	2.95	75.0	.48	12.2	1.70	43.2
601-800	4.33	110.0	2.50	63.5	.37	9.5	1.75	44.4	3.17	80.5	.56	14.1	1.70	43.2

AMP-TRAP® Class T Fast Acting A3T & A6T

A3T30 to 1200



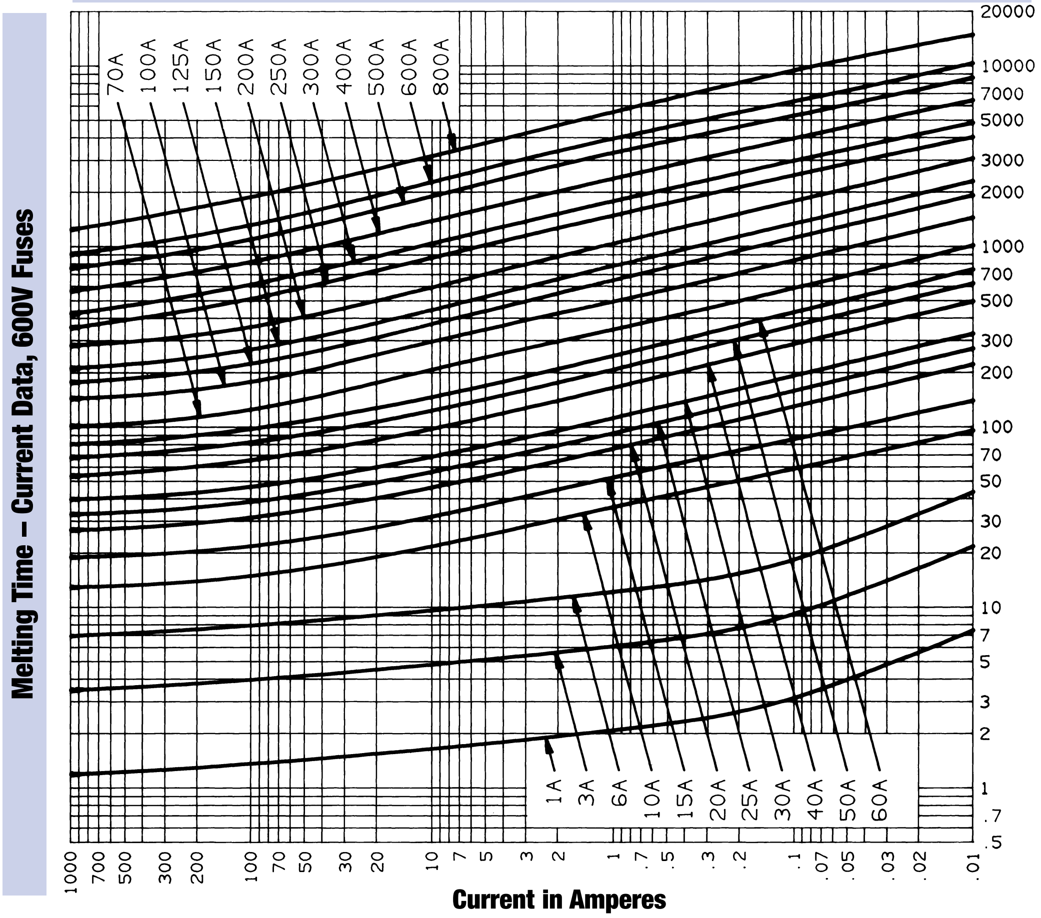
Peak Let-Thru Current Data – A3T30 to 1200, 300 Volts AC



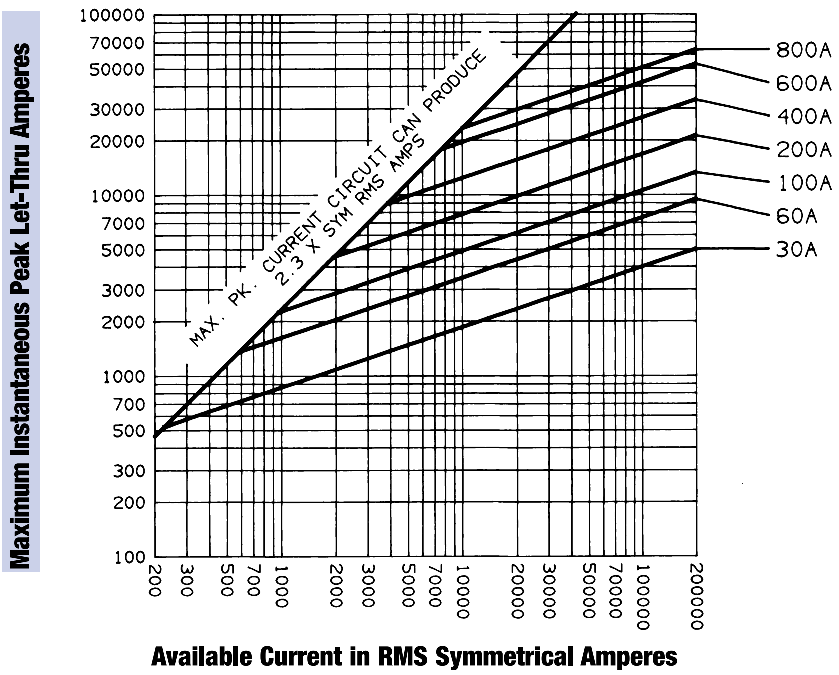
AMP-TRAP®

Class T Fast Acting A3T & A6T

A6T1 to 800



Peak Let-Thru Current Data – A6T30 to 800, 600 Volts AC



Ferraz Shawmut

General Purpose Fuses

North American Power Fuses

AMP-TRAP® Class RK1 Fast Acting A2K & A6K



THESE FAST-ACTING FUSES DELIVER A HIGH DEGREE OF CURRENT LIMITATION WHERE YOU NEED IT MOST

Current-limiting A2K and A6K fuses provide excellent protection where high available short circuit currents exist. These fast-acting fuses are particularly good for branch/feeder circuits and back-up protection.

Features / Benefits

- ✔ **Rejection style design** prevents replacement by other fuse classes
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial environments
- ✔ **Easy-to-read imprint label** for quick recognition and replacement
- ✔ **High degree of current limitation** for low peak let-thru current

HIGHLIGHTS:

- ✔ Highly Current-Limiting
- ✔ Fast Acting
- ✔ Rejection Style

APPLICATIONS:

- ✔ Loadcenters
- ✔ Panelboards
- ✔ Switchboards
- ✔ Bus Duct
- ✔ Feeder Circuits
- ✔ Non-inductive Loads
- ✔ Lighting Circuits

Ratings

- ✔ **A2K**
  AC: 1 to 600A
  250VAC, 200kA I.R.
- ✔ **A6K**
  AC: 1 to 600A
  600VAC, 200kA I.R.

Approvals

- ✔ UL Listed to Standard 248-12
- ✔ CSA Certified to Standard C22.2 No. 248.12

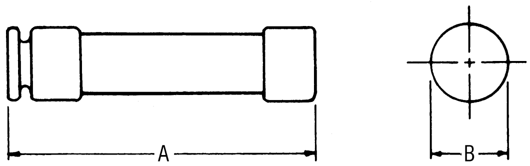
General Purpose Fuses

North American Power Fuses

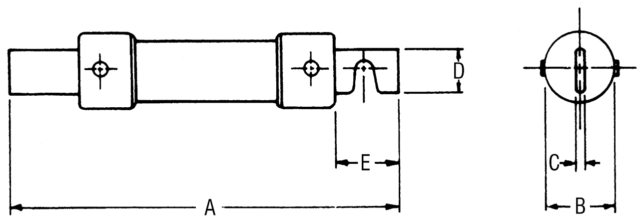
AMP-TRAP® Class RK1 Fast Acting A2K & A6K

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER		REFERENCE NUMBER		AMPERE RATING	CATALOG NUMBER		REFERENCE NUMBER	
	250V	600V	250V	600V		250V	600V	250V	600V
1	A2K1R	A6K1R	M215245	A219880	70	A2K70R	A6K70R	H211147	K217290
3	A2K3R	A6K3R	N217799	M201928	80	A2K80R	A6K80R	A211669	P217800
4	-	A6K4R	-	H212182	90	A2K90R	A6K90R	F212180	A218316
5	A2K5R	A6K5R	P222561	J213218	100	A2K100R	A6K100R	L215244	Y201409
6	A2K6R	A6K6R	L200869	H214229	110	A2K110R	A6K110R	V216264	L201927
8	-	A6K8R	-	L214738	125	A2K125R	A6K125R	V216770	J211148
10	A2K10R	A6K10R	G213216	N218834	150	A2K150R	A6K150R	H217288	B211670
12	A2K12R	-	F214227	-	175	A2K175R	A6K175R	M217798	G212181
15	A2K15R	A6K15R	J214736	B219352	200	A2K200R	A6K200R	Y218314	Y212702
20	A2K20R	A6K20R	Q215754	Q222562	225	A2K225R	A6K225R	L218832	H213217
25	A2K25R	A6K25R	W216265	G223083	250	A2K250R	A6K250R	Z219350	Z213715
30	A2K30R	A6K30R	W216771	M200870	300	A2K300R	A6K300R	Y219878	G214228
35	A2K35R	A6K35R	J217289	Z201410	350	A2K350R	A6K350R	N222560	K214737
40	A2K40R	A6K40R	Z218315	K211149	400	A2K400R	A6K400R	E223081	N215246
45	A2K45R	A6K45R	M218833	C211671	450	A2K450R	A6K450R	K200868	R215755
50	A2K50R	A6K60R	Z219879	A213716	500	A2K500R	A6K500R	X201408	X216266
60	A2K60R	A6K60R	F223082	A213716	600	A2K600R	A2K600R	K201926	X216772



0-60A



61-600A

Recommended Fuse Blocks With Box Connectors For Amp-trap Class RK1 Fuses

Fuse Ampere Rating	Catalog Number 250V		Reference Number 250V	
	1 Pole	3 pole	1 pole	3 pole
0-30	20306R	20308R	T213411	K215956
31-60	20606R	20608R	B212383	E214939
61-100	21036R	21038R	D201621	M212899
101-200	22001R	22003R	R213915	G214941
201-400	24001R	24003R	J219566	D222022
401-600	2631R	2633R	H214942	P215960

Fuse Ampere Rating	Catalog Number 600V		Reference Number 600V	
	1 Pole	3 pole	1 pole	3 pole
0-30	60306R	60308R	H212389	K214438
31-60	60606R	60608R	K212391	M214440
61-100	61036R	61038R	W204788	Z211875
101-200	61036R	62003R	W204788	B213924
201-400	64001R	64003R	D219055	M222030
401-600	6631R	6633R	J216990	E218021

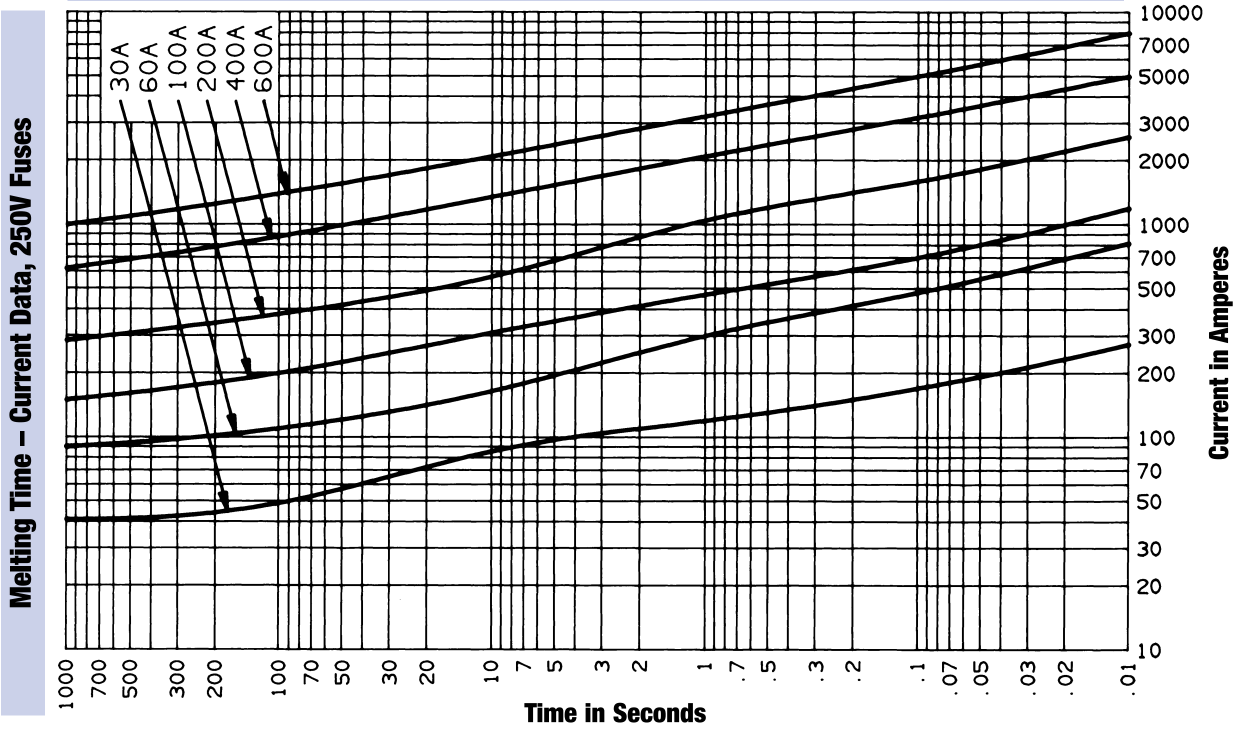
A variety of pole configurations and termination provisions is available. Refer to the fuse block section of this catalog for details.

Dimensions

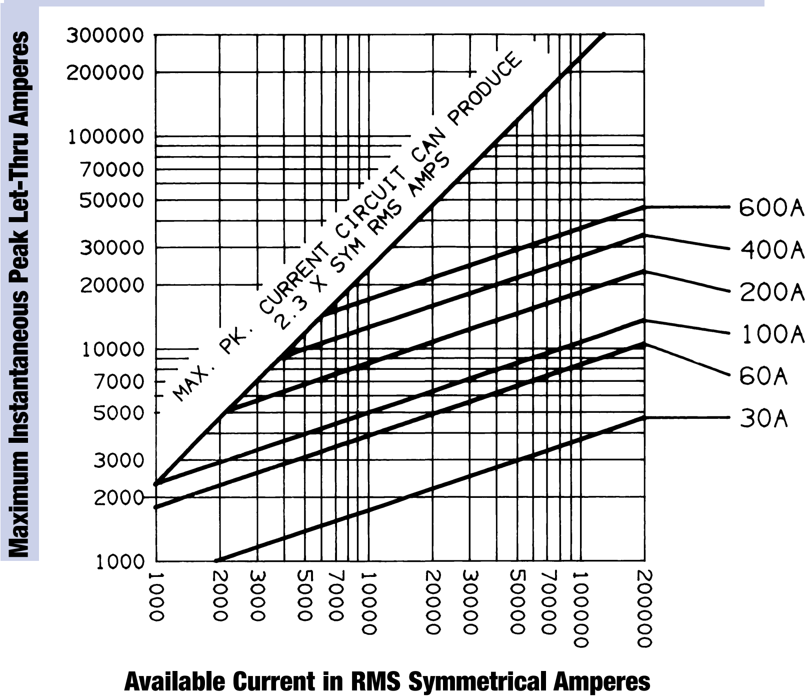
AMPERE RATING	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
250V-A2K FUSES										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-7/8	149	1-1/16	27	1/8	3	3/4	19	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	53	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-A6K FUSES										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

AMP-TRAP® Class RK1 Fast Acting A2K & A6K

A2K30 to 600



Peak Let-Thru Current Data – A2K30 to 600, 250 Volts AC

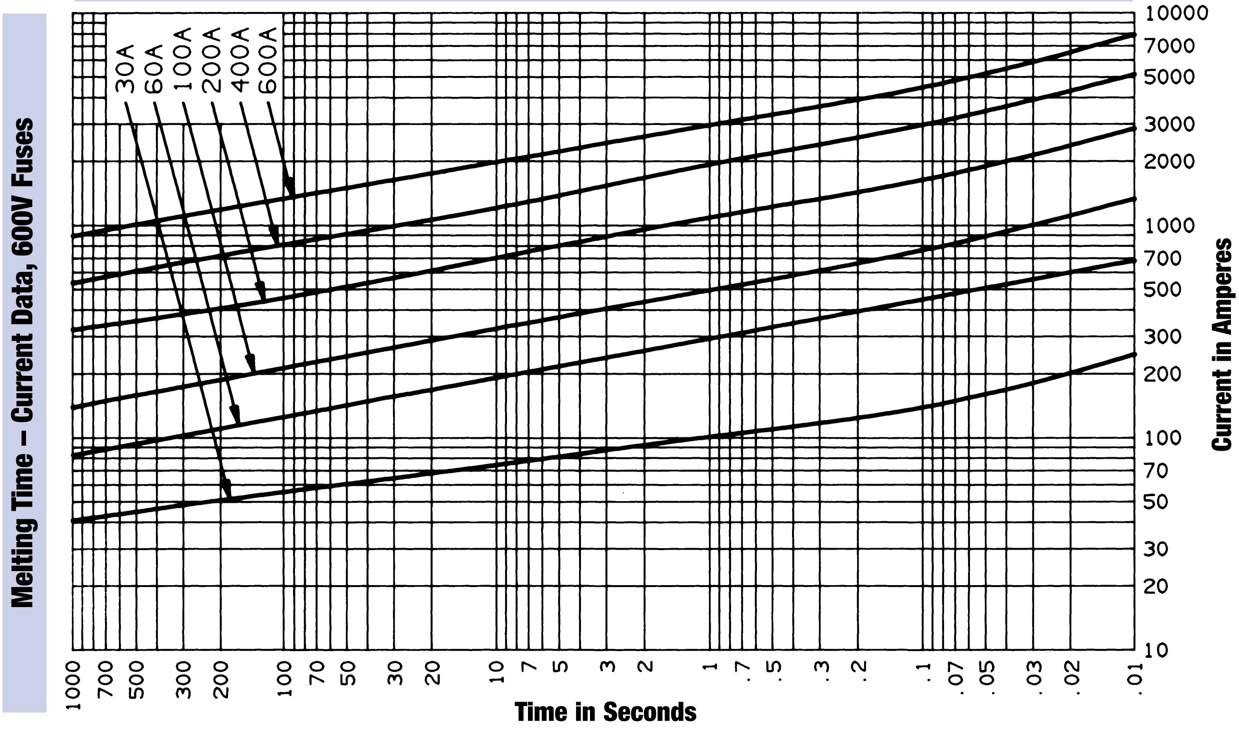


General Purpose Fuses

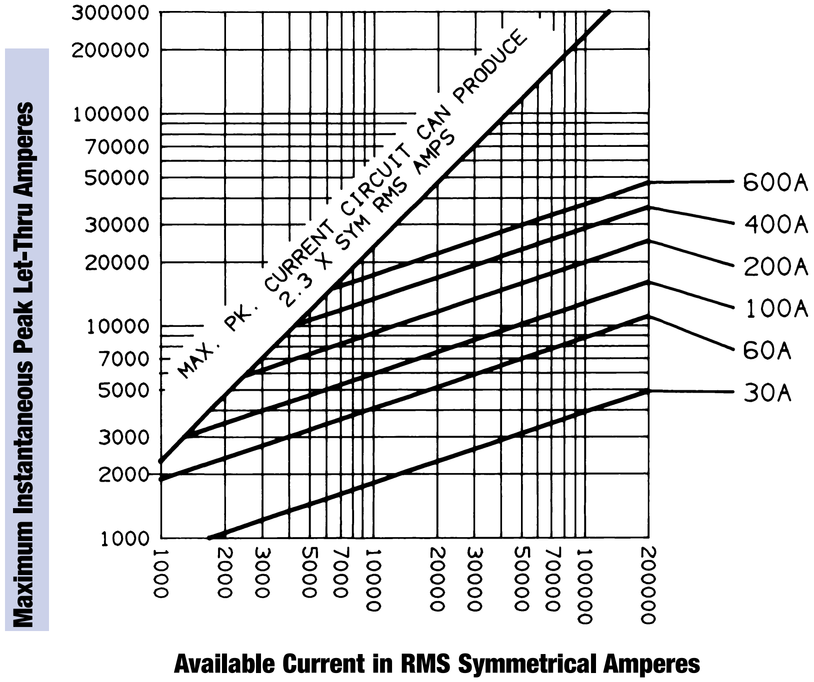
North American Power Fuses

AMP-TRAP® Class RK1 Fast Acting A2K & A6K

A6K30 to 600



Peak Let-Thru Current Data – A6K30 to 600, 600 Volts AC



AMP-TRAP® Class G AG



AMP-TRAP AG FUSES FIT RIGHT IN TO A WIDE VARIETY OF INDUSTRIAL APPLICATIONS

The Ferraz Shawmut Amp-trap AG fuse series is a complete line of Class G fuses. With time delay (above 5A rating) and 480 volt rating, AG fuses safely fit a wide variety of applications. Class G fuses are made in four physical sizes and provide good branch-circuit protection for lighting, heating, and appliance circuits.

Features / Benefits

- ✔ **Four unique sizes** from 1-60 amperes do not allow inter-changeability with other fuse classes
- ✔ **Fiberglass bodies** provide dimensional stability in harsh industrial settings

HIGHLIGHTS:

- ✔ Current-Limiting
- ✔ Time Delay (above 5A)
- ✔ 480 Volt Rating

APPLICATIONS:

- ✔ Lighting
- ✔ Heating*
- ✔ Appliances
- ✔ Branch Circuits

* Except in Canada, where fuses must be "P" or "D" type.

Ratings

- ✔ **AC:** 1/2 to 60A 480VAC, 100kA I.R.

Approvals

- ✔ UL Listed to Standard 248-5
- ✔ CSA Certified to Standard C22.2 No. 248.5

AMP-TRAP® Class G AG

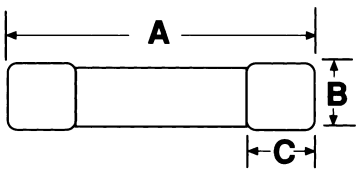
Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1/2	AG1/2	P201470
1	AG1	T223140
1-1/2	AG1-1/2	B200929
2	AG2	R211730
3	AG3	Y213277
4	AG4	B215304
5	AG5	L216831
6	AG6	H217863
8	AG8	F218896
10	AG10	Z201985
15	AG15	A211209
20	AG20	Z212243
25	AG25	L212760
30	AG30	P213775
35	AG35	Y214289
40	AG40	D215812
45	AG45	H216322
50	AG50	A217350
60	AG60	R218377

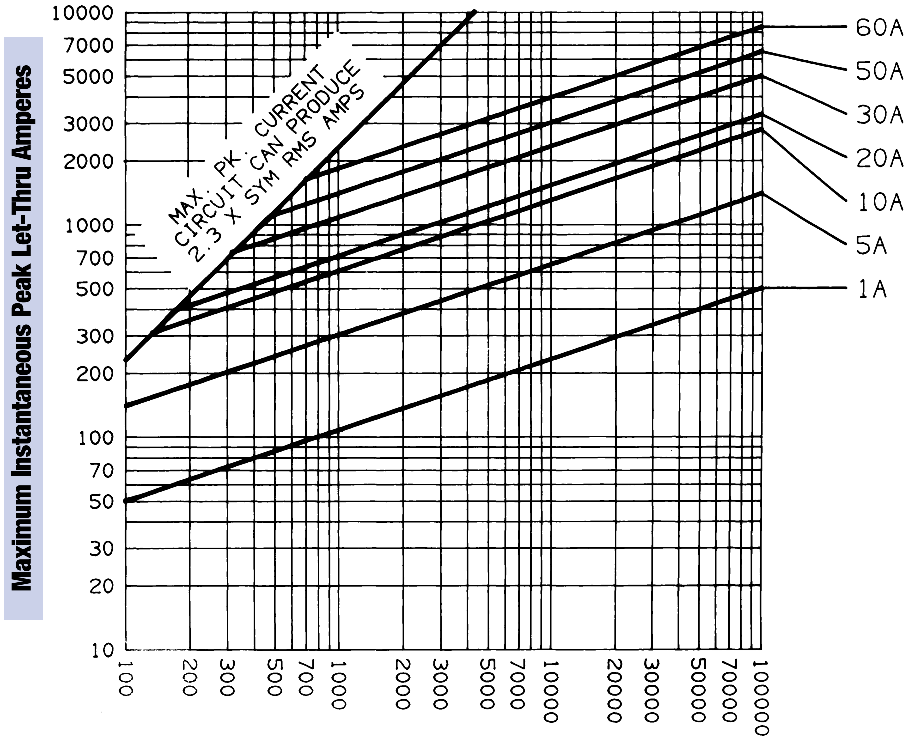
Dimensions

AMPERE RATING	A		B		C	
	In.	mm	In.	mm	In.	mm
1/2-15A	1.31	33.3	.406	10.3	.28	7.1
20A	1.41	35.8	.406	10.3	.28	7.1
25, 30A	1.62	41.2	.406	10.3	.28	7.1
35-60A	2.25	57.2	.406	10.3	.50	12.7

Cross Reference:
AG will replace the following fuses: Bussmann SC, Littelfuse SLC



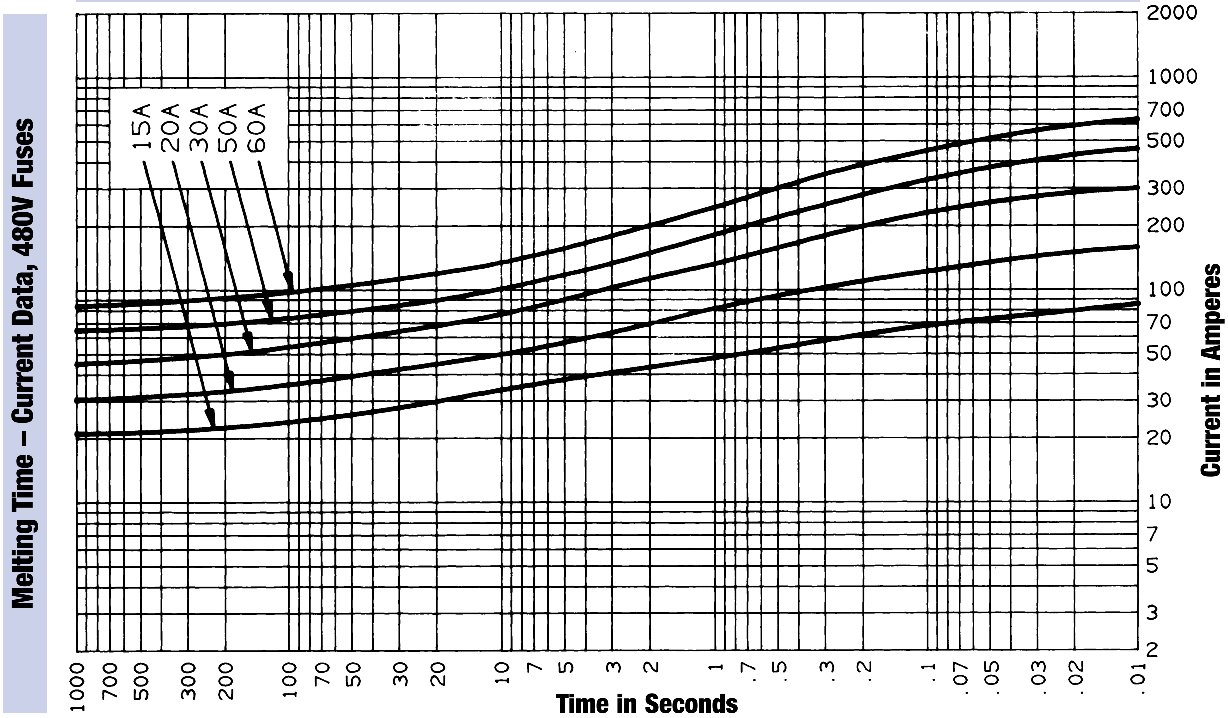
Peak Let-Thru Current Data – AG1 to 60, 480 Volts AC



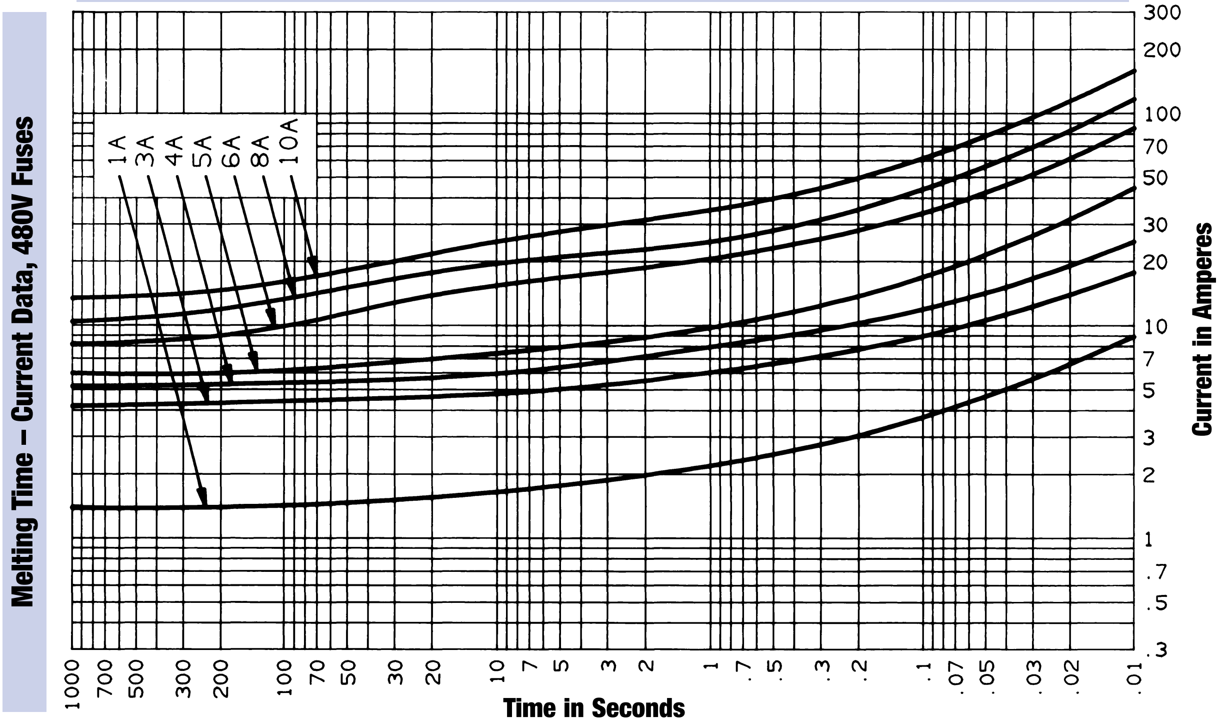
Ferraz Shawmut

AMP-TRAP® Class G AG

AG15 to 60



AG1 to 10



North American Power Fuses

AMP-TRAP® Class CC ATMR



SMALL FUSE - BIG PROTECTION FOR GENERAL CIRCUITS

Amp-trap ATMR fuses, in the Class CC family, are the smallest dimension 600V fuses suitable for branch circuit protection. The ATMR is a popular choice for economical protection of control circuits and control circuit transformers where available short circuit currents exceed 10,000 amperes. ATMR's rejection dimensions prevent substitution by lesser rated fuses. These fast acting fuses give current limiting protection to general circuits.

Features/Benefits

- ✔ **Rejection style design** prevents replacement errors when used with recommended fuse blocks
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial environments
- ✔ **Versatile design** for individual component and branch circuit protection

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Very Current-Limiting

APPLICATIONS:

- ✔ Control Circuits
- ✔ Lighting
- ✔ General Loads
- ✔ Branch Circuit Protection

Ratings

- ✔ **AC:** 1/10 to 30A 600VAC, 200kA I.R.

Approvals

- ✔ UL Listed to Standard 248-4
- ✔ CSA Certified to Standard C22.2 No. 248.4

General Purpose Fuses

North American Power Fuses

AMP-TRAP® Class CC ATMR

Standard Fuse Ampere Ratings

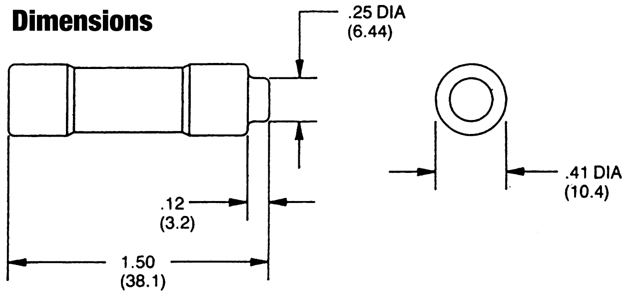
AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1/10	ATMR1/10	C217789	3-1/2	ATMR3-1/2	Y213208
1/8	ATMR1/8	P219341	4	ATMR4	G215746
2/10	ATMR2/10	B201918	5	ATMR5	M216257
1/4	ATMR1/4	C218824	6	ATMR6	L216762
3/10	ATMR3/10	W214218	7	ATMR7	Z217280
1/2	ATMR1/2	N218305	8	ATMR8	D217790
3/4	ATMR3/4	Z214727	9	ATMR9	P218306
1	ATMR1	L216256	10	ATMR10	P219870
1-1/4	ATMR1-1/4	Y217279	12	ATMR12	D222551
1-1/2	ATMR1-1/2	K216761	15	ATMR15	V223072
2	ATMR2	A200859	20	ATMR20	Z211139
2-1/2	ATMR2-1/2	N201400	25	ATMR25	Q211660
3	ATMR3	N212693	30	ATMR30	C215236

Recommended Fuse Blocks For Amp-Trap® Class CC Fuses

Number of Poles	CATALOG NUMBER				REFERENCE NUMBER			
	ULTRASAFE Indicating Fuse Holder	Screw Connector w/ Double Quick Connects	Pressure Plate Connector w/ Double Quick Connects	Copper Box Connector	ULTRASAFE Indicating Fuse Holder	Screw Connector w/ Double Quick Connects	Pressure Plate Connector w/ Double Quick Connects	Copper Box Connector
ADDER		30310R	30320R	30350R		W204857	Z217510	N213429
1	USCC1I	30311R	30321R	30351R	X213943	R212397	M218534	G213929
2	USCC2I	30312R	30322R	30352R	D217008	Z212910	Y219579	V214447
3	USCC3I	30313R	30323R	30353R	Y218038	M213428	B222779	X214955

Refer to the Class CC Fuse Block section of this catalog for other details.

Dimensions



Primary Fuse Sizing For Control Transformers

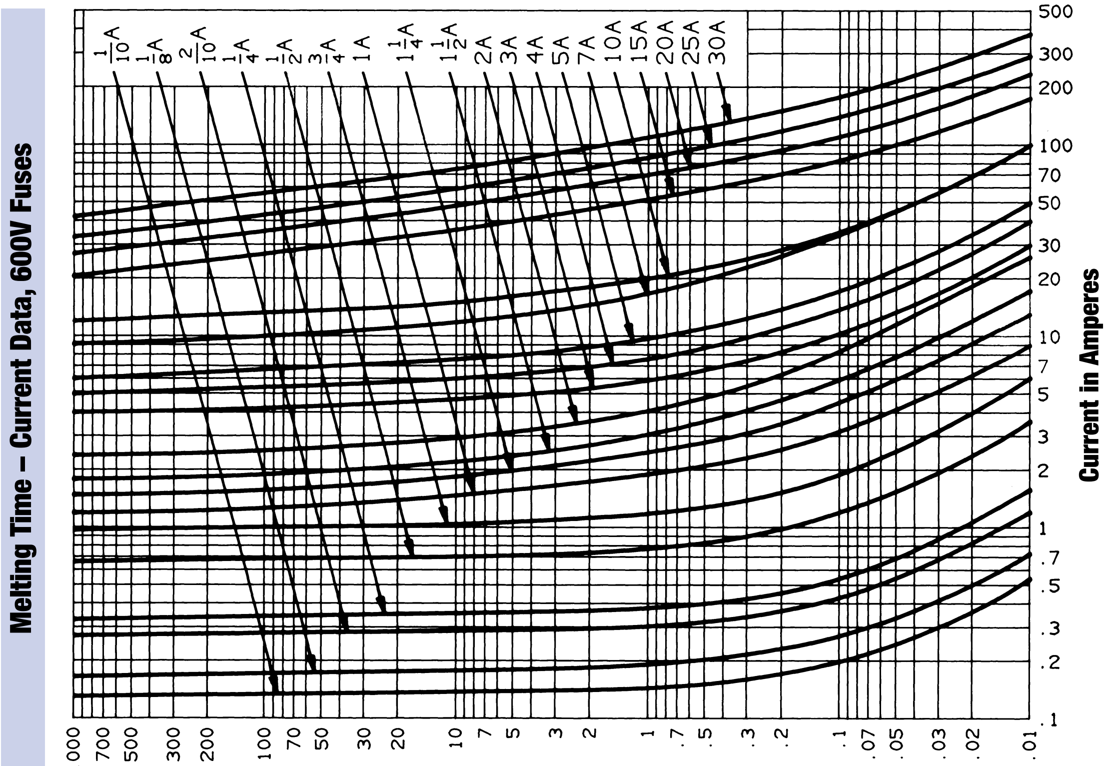
TRANSFORMER VOLT-AMPERES	ATMR RATING 480V PRIMARY	ATMR RATING 600V PRIMARY
50	1/2*	3/10*
75	3/4*	1/2*
100	1	3/4*
150	1-1/2	1*
200	2	1-1/2*
250	2	2
300	3	2
350	3-1/2	2
500	5	4
750	7	6
1000	-	8

All ratings will withstand inrush currents of 40 times transformer full load for 1/2 cycle unless otherwise noted.

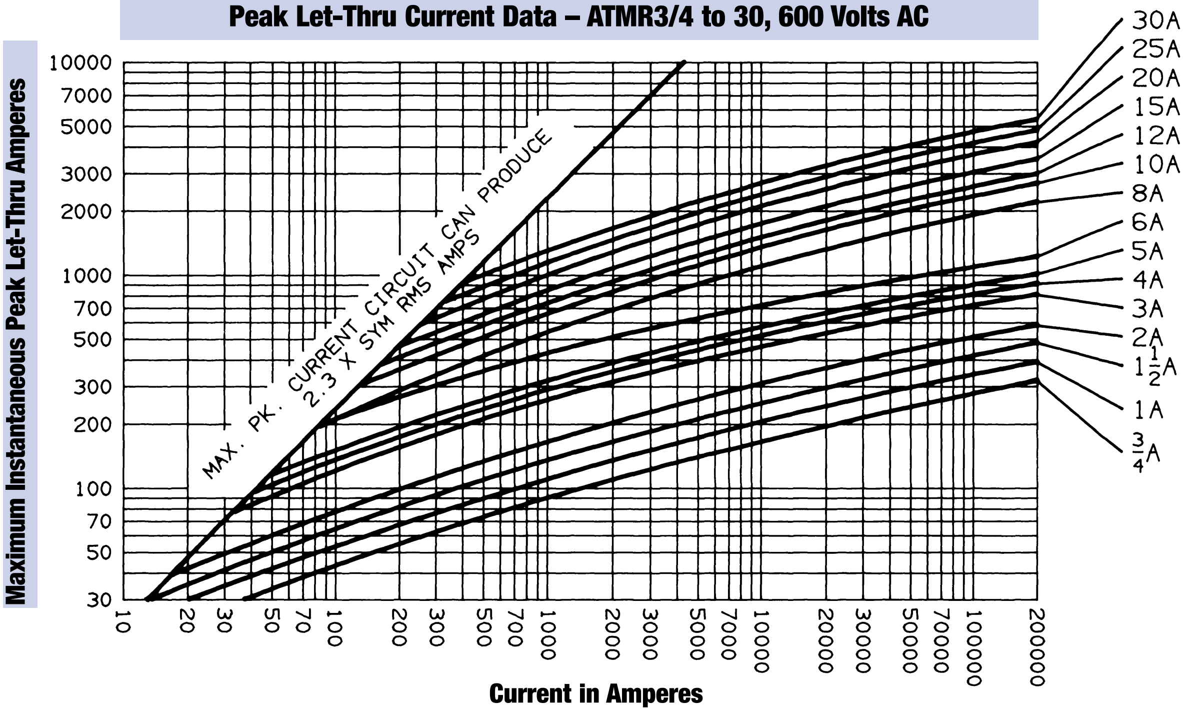
* These ratings will withstand inrush currents of 35 times transformer full load for 1/2 cycle.

AMP-TRAP® Class CC ATMR

ATMR1/10 to 30



Peak Let-Thru Current Data – ATMR3/4 to 30, 600 Volts AC



General Purpose Fuses

North American Power Fuses

ONE-TIME — Class K-5 OT, ON, OTS



FOR VERSATILITY AND ECONOMY, THESE GENERAL PURPOSE FUSES ARE HARD TO BEAT

OT, OTN and OTS general purpose fuses provide low cost protection for feeder and branch circuits serving lighting, heating, and other non-motor loads. OT, OTN and OTS fuses will safely interrupt available short circuit currents up to 50,000 amperes in all ratings.

OT, OTN and OTS fuses are not rejection fuses – care should be taken to ensure that replacement fuses do not have lower interrupting ratings than original fuses.

OTN 15 through 60 satisfy the Canadian electrical code requirement for Type "P," low melting-point, non-time delay fuses.

Features/Benefits

- ✔ **Easy to read imprint label** for quick recognition and replacement
- ✔ **Low cost** for high protection value

HIGHLIGHTS:

- ✔ Versatile
- ✔ Lowest cost protection for circuits serving non-inductive loads

APPLICATIONS:

- ✔ Feeders
- ✔ Branch Circuits
- ✔ Resistive Heating
- ✔ Residential and Small Commercial Installations

Ratings

- ✔ **OT**
  AC: 1 to 600A
  250VAC, 50kA I.R.
- ✔ **OTN (Canada)**
  AC: 15 to 60A
  250VAC, 50kA I.R.
- ✔ **OTS**
  AC: 1 to 600A
  600VAC, 50kA I.R.

Approvals

- ✔ UL Listed to Standard 248-9
- ✔ CSA Certified to Standard C22.2 No. 248.9*

* The Canadian Electrical Code requires these fuses in ratings 15 through 60A to be of the low melting point design use OTN 15-60.

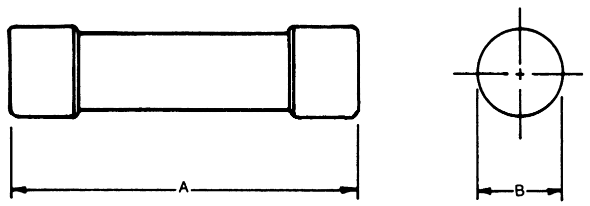
General Purpose Fuses

North American Power Fuses

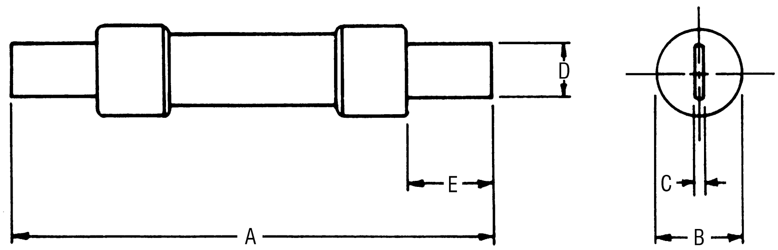
ONE-TIME Class K-5 OT, ON, OTS

Standard Fuse Ampere Ratings

Ampere Rating	Catalog Number 250V	Catalog Number 600V	Reference Number 250V	Reference Number 600V	Ampere Rating	Catalog Number 250V	Catalog Number 600V	Reference Number 250V	Reference Number 600V
1	OT1	OTS1	H218277	D215720	65	OT65	OTS65	V201889	-
2	OT2	OTS2	Y222523	L218280	70	OT70	OTS70	T211111	A222525
3	OT3	OTS3	K201374	M219845	75	OT75	OTS75	H211630	R223046
4	OT4	OTS4	Q212143	Y200834	80	OT80	OTS80	P212142	X200833
5	OT5	OTS5	W214701	Y211115	90	OT90	OTS90	G212664	M201376
6	OT6	OTS6	H216230	T212146	100	OT100	OTS100	Y215209	T213181
7	OT7	OTS7	Z217763	-	110	OT110	OTS110	Z215716	L213680
8	OT8	OTS8	J218278	W213183	125	OT125	OTS125	F216228	S214192
10	OT10	OTS10	X218796	K216232	150	OT150	OTS150	D216732	X214702
12	OT12	OTS12	H219312	H216736	175	OT175	OTS175	S217251	B215212
15	OT15	OTS15	J219842	X217255	200	OT200	OTS200	X217761	C215719
20	OT20	OTS20	P223044	Z218798	225	OT225	OTS225	G218276	J216231
25	OT25	OTS25	V200831	L219315	250	OT250	OTS250	W218795	G216735
30	OT30	OTS30	W201890	B222526	300	OT300	OTS300	G219311	W217254
35	OT35	OTS35	J211631	S223047	350	OT350	OTS350	H219841	A217764
40	OT40	OTS40	H212665	N201377	400	OT400	OTS400	X222522	K218279
45	OT45	OTS45	K213679	Z201893	450	OT450	OTS450	N223043	Y218797
50	OT50	OTS50	A215211	M211634	500	OT500	OTS500	T200830	K219314
60	OT60	OTS60	F216734	L212668	600	OT600	OTS600	J201373	L219844



0-60A



61-600A

Recommended Fuse Blocks With Box Connectors For One-Time Class K-5 Fuses

Fuse Ampere Rating	Catalog Number 250V 1 Pole	Catalog Number 250V 3 pole	Reference Number 250V 1 pole	Reference Number 250V 3 pole
0-30	20306	20308	Z212381	F215446
31-60	20606	20608	N211865	C214431
61-100	21036	21038	S201105	Q211867
101-200	22001	22003	Y213415	E214433
201-400	24001	24003	T219046	-
401-600	2631	2633	F214434	K215450

Fuse Ampere Rating	Catalog Number 600V 1 Pole	Catalog Number 600V 3 pole	Reference Number 600V 1 pole	Reference Number 600V 3 pole
0-30	60306	60308	V211871	X213920
31-60	60606	60608	X211873	Z213922
61-100	61036	61038	K201627	S211363
101-200	62001	62003	M212393	H213424
201-400	64001	64003	H218530	T219575
401-600	6631	6633	Z216475	W217507

A variety of pole configurations and termination provisions is available. Refer to the fuse block section of this catalog for details.

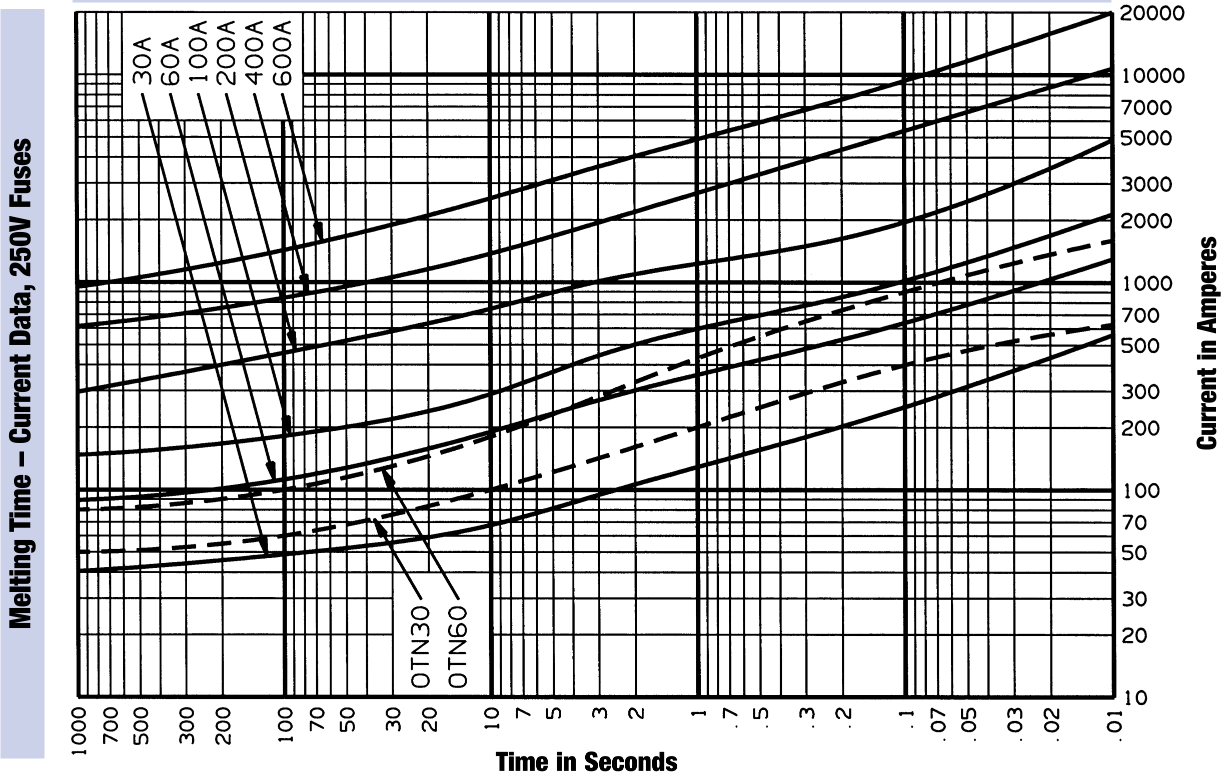
Dimensions

AMPERE RATING	A In.	A mm	B In.	B mm	C In.	C mm	D In.	D mm	E In.	E mm
250V-OT, OTN FUSES										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-7/8	149	1-1/16	27	1/8	3	3/4	19	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	53	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-OTS FUSES										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

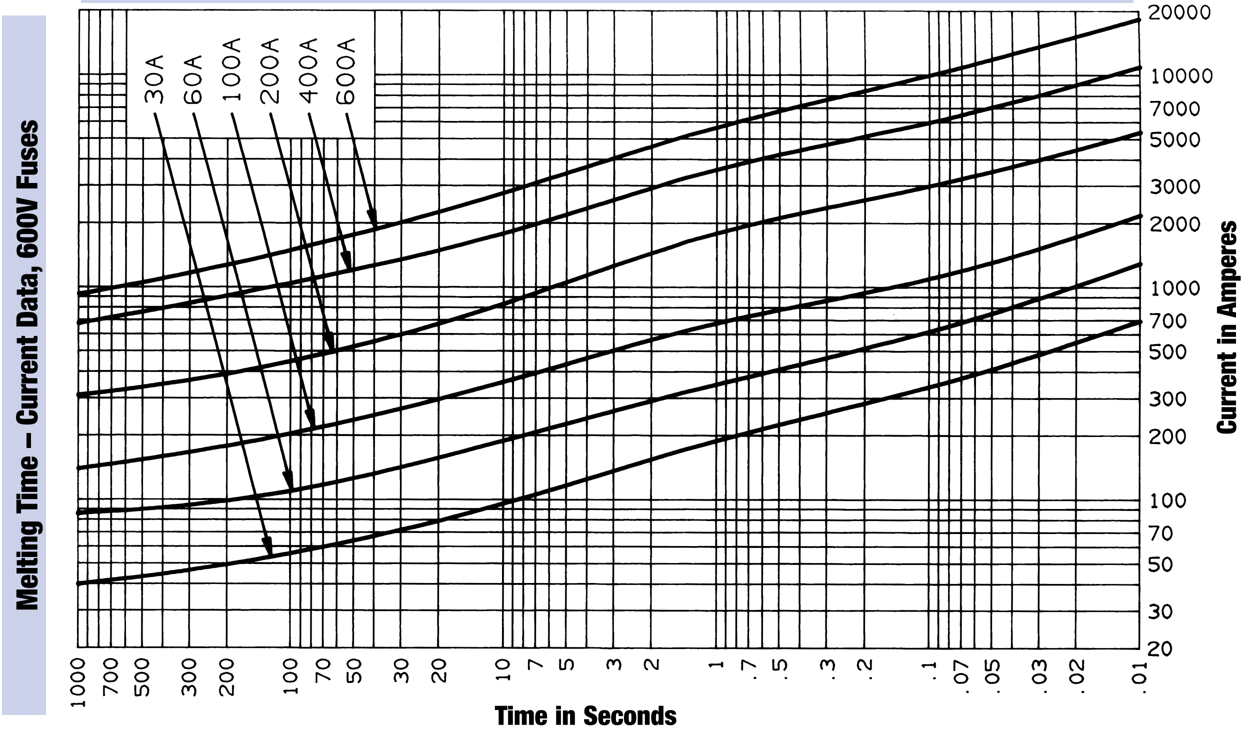
ONE-TIME

Class K-5 OT, ON, OTS

OT30 to 600; OTN 30, 60



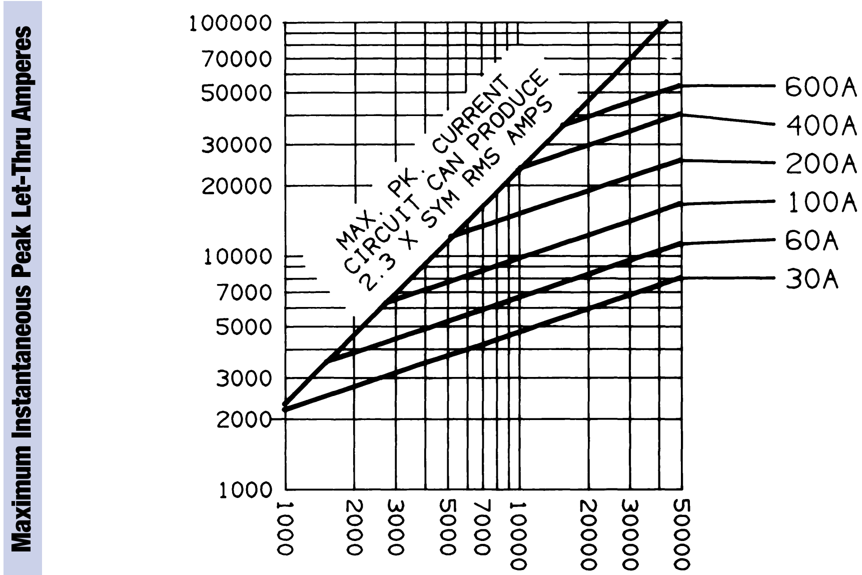
OTS30 to 600



ONE-TIME

Class K-5 OT, ON, OTS

Peak Let-Thru Current Data – OT, OTN & OTS30 to 600, 250 and 600 Volts AC



Available Current in RMS Symmetrical Amperes

North American Power Fuses

RENEWABLE Class H RF/RFS & RL/RLS



TRADITIONAL PROTECTION FOR CIRCUITS WITH LESS THAN 10,000A SHORT CIRCUIT CURRENT

RF and RFS general purpose fuses are suitable for application where available short circuit currents do not exceed 10,000 amperes. RF and RFS renewable fuses use matched RL and RLS die-cut zinc links from 1 to 600 amperes in 32 ratings.

Features/Benefits

- ✔ **Knurled bushings** for ease of disassembly
- ✔ **Rugged construction** for maximum service life
- ✔ **Precision die-cut renewal links** renew quickly and give repeatable performance

HIGHLIGHTS:

- ✔ Renewable
- ✔ 32 Renewal Link Ratings

APPLICATIONS:

- ✔ General purpose loads where short circuits are 10,000 amperes or less

Ratings

- ✔ **RF**
  AC: 1 to 600A
  250VAC, 10kA I.R.
- ✔ **RFS**
  AC: 1 to 600A
  600VAC, 10kA I.R.

Approvals

- ✔ UL Listed to Standard 248-7
- ✔ CSA Certified to Standard C22.2 No. 248.7

General Purpose Fuses

North American Power Fuses

RENEWABLE — Class H RF/RFS & RL/RLS

Standard Fuse Ampere Ratings, Catalog Numbers

Ampere Rating	Catalog Number		Ampere Rating	Catalog Number		Ampere Rating	Catalog Number	
	250V	600V		250V	600V		250V	600V
1	RF1	RFS1	45	RF45	RFS45	225	RF225	RFS225
2	RF2	RFS2	50	RF50	RFS50	250	RF250	RFS250
3	RF3	RFS3	60	RF60	RFS60	300	RF300	RFS300
5	RF5	RFS5	70	RF70	RFS70	350	RF350	RFS350
6	RF6	RFS6	80	RF80	RFS80	400	RF400	RFS400
10	RF10	RFS10	90	RF90	RFS90	450	RF450	RFS450
15	RF15	RFS15	100	RF100	RFS100	500	RF500	RFS500
20	RF20	RFS20	110	RF110	RFS110	600	RF600	RFS600
25	RF25	RFS25	125	RF125	RFS125			
30	RF30	RFS30	150	RF150	RFS150			
35	RF35	RFS35	175	RF175	RFS175			
40	RF40	RFS40	200	RF200	RFS200			

Standard Fuse Ampere Ratings, Reference Numbers

Ampere Rating	Reference Number		Ampere Rating	Reference Number		Ampere Rating	Reference Number	
	250V	600V		250V	600V		250V	600V
1	W217323	T201957	45	D216295	W212217	225	V211181	G216804
2	X200902	Z215279	50	B217834	L213749	250	T212215	C217835
3	H212734	A218868	60	N219386	A215280	300	K213748	Z200904
5	X217324	W213252	70	B222595	F216297	350	V214769	V201958
6	Z218867	X214771	80	R223115	H216805	400	Y215784	P211705
10	A217833	W211182	90	Y200903	Z217326	450	F216803	K212736
15	H219910	V213251	100	L218349	N211704	500	M218350	V214263
20	J201442	Z215785	110	Y218866	V212216	600	J219911	A215786
25	M211703	Y217325	125	M219385	J212735			
30	T213250	C222596	150	A222594	T214262			
35	S214261	L201444	175	Q223114	W214770			
40	Y215278	X211183	200	S201956	E216296			

Recommended Fuse Blocks With Box Connectors For Renewable Class H Fuses

Fuse Ampere Rating	Catalog Number			
	250V		600V	
	1 Pole	3 pole	1 pole	3 pole
0-30	20306	20308	60306	60308
31-60	20306	20608	60606	60608
61-100	21036	21038	61036	61038
101-200	22001	22003	62001	62003
201-400	24001	24003	64001	64003
401-600	2631	2633	6631	6633

Fuse Ampere Rating	Reference Number			
	250V		600V	
	1 Pole	3 pole	1 pole	3 pole
0-30	Z212381	F215446	V211871	X213920
31-60	Z212381	C214431	X211873	Z213922
61-100	S201105	Q211867	K201627	S211363
101-200	Y213415	E214433	M212393	H213424
201-400	T219046	-	H218530	T219575
401-600	F214434	K215450	Z216475	W217507

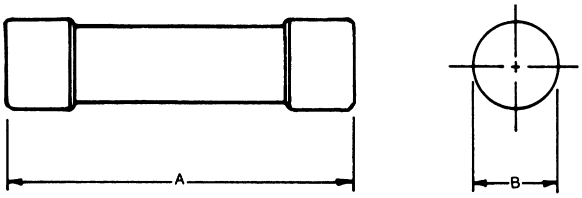
A variety of pole configurations and termination provisions is available. Refer to the fuseholder section of this catalog for details.

General Purpose Fuses

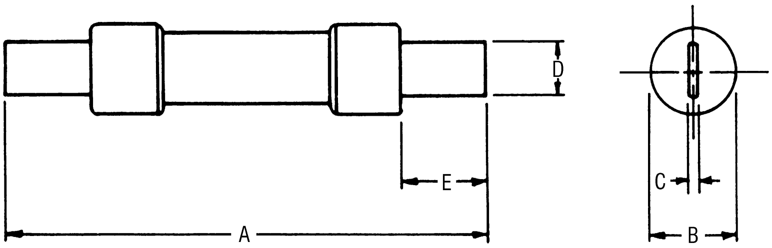
North American Power Fuses

RENEWABLE

Class H RF/RFS & RL/RLS



0-60A



61-600A

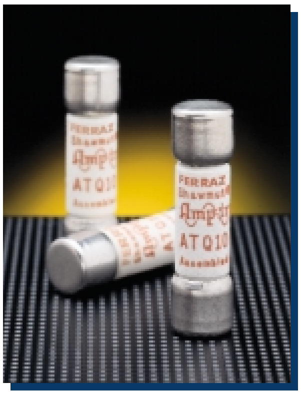
Dimensions

AMPERE	A		B		C		D		E	
RATING	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
250V-RF FUSES										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-7/8	149	1-1/16	27	1/8	3	3/4	18	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	54	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-RFS FUSES										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	18	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	67	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

General Purpose Fuses

Midget Fuses

10.3 x 38 — 500VAC Time Delay ATQ



Amp-trap® ATQ midget time-delay fuses are rated a full 500 volts AC with 42 ampere ratings from 1/10 to 30A. They are an excellent choice for supplemental protection of circuits up to 30A where the available short circuit current does not exceed 10,000A. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Numerous ratings** for a wide variety of applications up to 500VAC
- ✔ **Time delay** (12 seconds at 200% rating) for circuits with high inrush current
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Time Delay

APPLICATIONS:

- ✔ Supplemental protection of lighting, solenoid, motor, and transformer circuits

Ratings

- ✔ **AC:** 1/10 to 30A 500VAC, 10kA I.R.

Approvals

- ✔ UL Listed to Standard 248-14
- ✔ CSA Certified to Standard C22.2 No. 248.14

Standard Fuse Ampere Ratings, Catalog Numbers

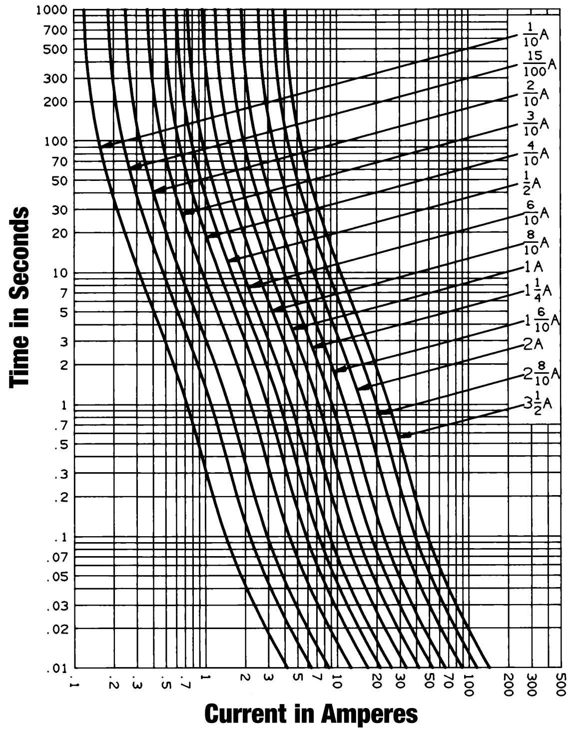
AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER
1/10	ATQ1/10	3/10	ATQ3/10	1-1/8	ATQ1-1/8	2	ATQ2	3-2/10	ATQ3-2/10	6	ATQ6	12	ATQ12
1/8	ATQ1/8	4/10	ATQ4/10	1-1/4	ATQ1-1/4	2-1/8	ATQ2-1/8	3-1/2	ATQ3-1/2	6-1/4	ATQ6-1/4	14	ATQ14
15/100	ATQ15/100	1/2	ATQ1/2	1-4/10	ATQ1-4/10	2-1/4	ATQ2-1/4	4	ATQ4	7	ATQ7	15	ATQ15
3/16	ATQ3/16	6/10	ATQ6/10	1-1/2	ATQ1-1/2	2-1/2	ATQ2-1/2	4-1/2	ATQ4-1/2	8	ATQ8	20	ATQ20
2/10	ATQ2/10	8/10	ATQ8/10	1-6/10	ATQ1-6/10	2-8/10	ATQ2-8/10	5	ATQ5	9	ATQ9	25	ATQ25
1/4	ATQ1/4	1	ATQ1	1-8/10	ATQ1-8/10	3	ATQ3	5-6/10	ATQ5-6/10	10	ATQ10	30	ATQ30

Standard Fuse Ampere Ratings, Reference Numbers

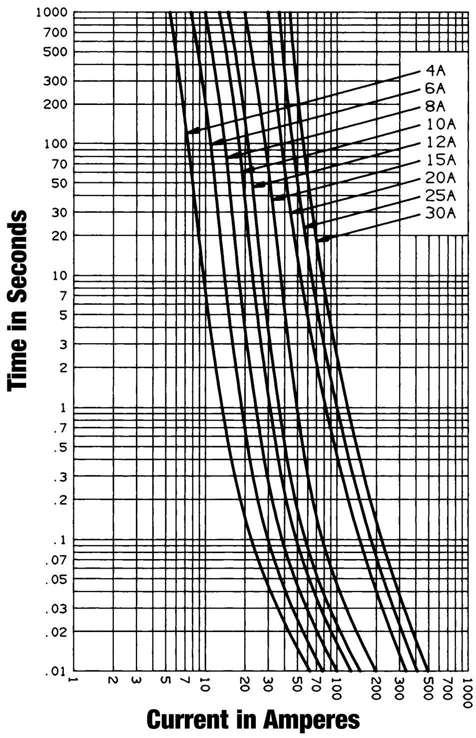
AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER
1/10	S211662	3/10	Q201402	1-1/8	R219872	2	P216259	3-2/10	D200862	6	Z214221	12	Y214220
1/8	A213210	4/10	R212696	1-1/4	R219343	2-1/8	F217792	3-1/2	Y223075	6-1/4	C214730	14	B214729
15/100	J215748	1/2	Y212173	1-4/10	F222553	2-1/4	B217282	4	T211663	7	P216765	15	E215238
3/16	D201920	6/10	F215239	1-1/2	Q218307	2-1/2	N216764	4-1/2	Z212174	8	C217283	20	S219344
2/10	E218826	8/10	G217793	1-6/10	X223074	2-8/10	R218308	5	B213211	9	S218309	25	S219873
1/4	Q212695	1	E217791	1-8/10	C200861	3	G222554	5-6/10	S213709	10	R213708	30	B211141

10.3 x 38 — 500VAC Time Delay ATQ

Melting Time – Current Data 1/10 - 3-1/2 Amperes, 500 Volts AC



Melting Time – Current Data 4 - 30 Amperes, 500 Volts AC



General Purpose Fuses

Midget Fuses

10.3 x 38 — 500-600VAC Fast Acting A6Y-2B



A6Y "Type 2B" Amp-trap® midget fuses are fast acting on short circuits, yet have sufficient time delay to offer supplemental protection for small motors, transformers, and control circuits. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Moderate amount of time delay** for circuits with inrush characteristics
- ✔ **Fast acting** on short circuits
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Fast Acting

APPLICATIONS:

- ✔ Supplemental protection of 600V (up to 3A) and 500V (3-2/10-15A) AC circuits
- ✔ Small motors, transformers, and control circuits

Ratings

- ✔ **AC:** 1/4 to 3A 600VAC, 10kA I.R.; 3-2/10 to 15A 500VAC, 10kA I.R.

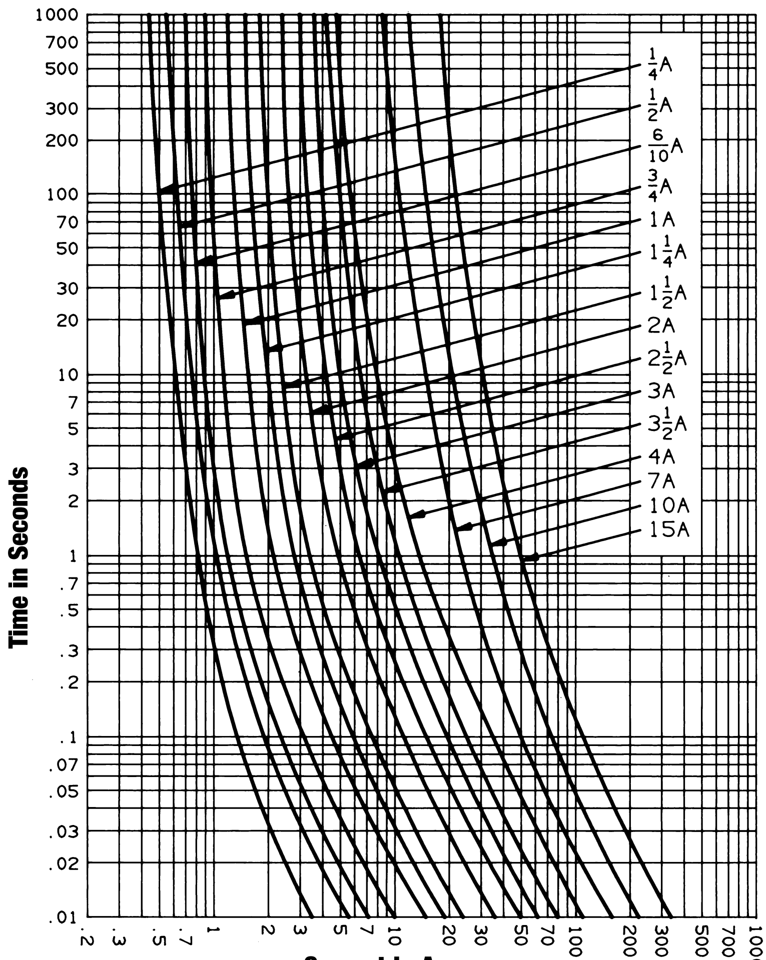
Approvals

- ✔ Ferraz Shawmut Certified

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1/4	A6Y1/4-2B	Y222546
1/2	A6Y1/2-2B	J219865
6/10	A6Y6/10-2B	T214722
3/4	A6Y3/4-2B	-
1	A6Y1-2B	X218819
1-1/4	A6Y1-1/4-2B	H218300
1-1/2	A6Y1-1/2-2B	X217784
1-6/10	A6Y1-6/10-2B	J219336
2	A6Y2-2B	T211134
2-1/2	A6Y2-1/2-2B	W201913
3	A6Y3-2B	H212688
3-2/10	A6Y3-2/10-2B	R212167
3-1/2	A6Y3-1/2-2B	K211655
4	A6Y4-2B	S213203
5	A6Y5-2B	K213702
6	A6Y6-2B	Q214213
7	A6Y7-2B	X215231
8	A6Y8-2B	B215741
9	A6Y9-2B	F216757
10	A6Y10-2B	P223067
12	A6Y12-2B	V200854
15	A6Y15-2B	H201395

Melting Time – Current Data 1/4 - 3 Amperes, 600 Volts AC; 3-2/10 - 15 Amperes, 500 Volts AC



General Purpose Fuses

Midget Fuses

10.3 x 38 — 600VAC 500VDC Fast Acting ATM



Amp-trap® midget fast-acting ATM fuses are rated 600 volts AC, with a 100kA interrupting rating. These ratings give the ATM a wide range of applications not covered by other midget fuses. In addition, ratings of 30/35, 30/40 and 30/50 amperes are offered for specific applications such as capacitor protection. These ATM fuses must still be considered 30A fuses because of their dimensions, but are able to withstand much higher inrush currents and tougher duty cycles. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **For supplemental protection** of small motors and transformers
- ✔ **Extended ratings** for special protection of capacitors and circuits with high inrush currents
- ✔ **500VDC ratings** for a wide variety of applications
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Special Ratings (above 30A)

APPLICATIONS:

- ✔ Supplemental protection of a wide variety of circuits up to 600VAC and 500VDC with 100kA I.R.

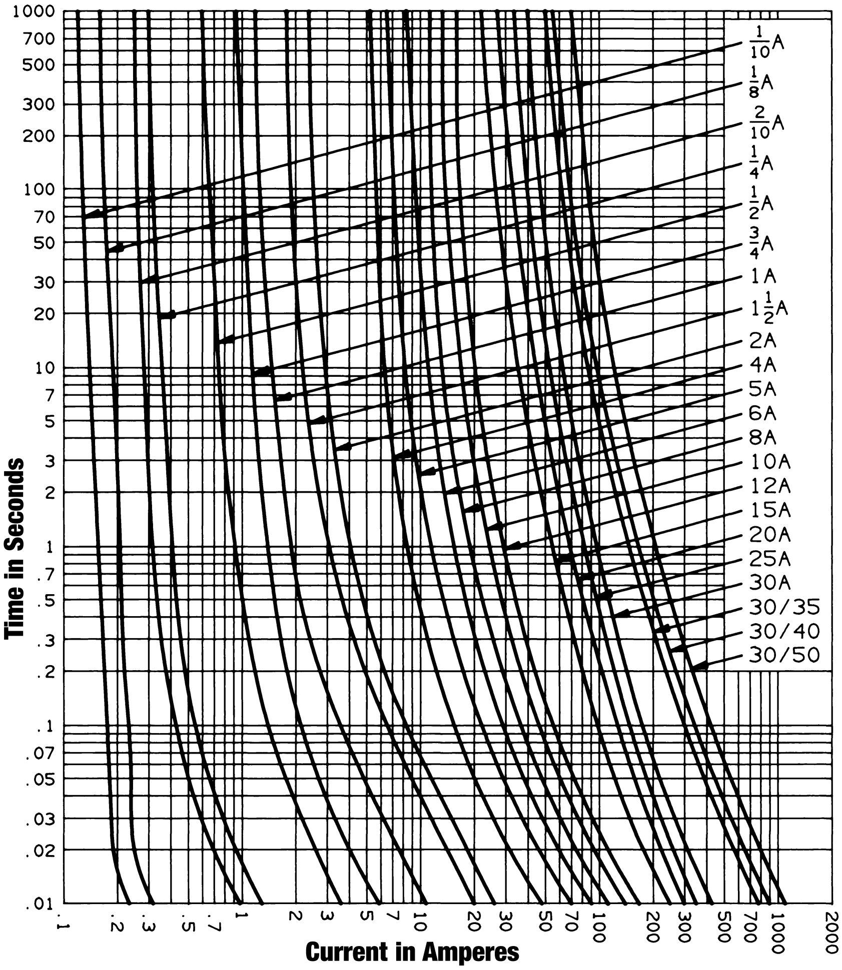
Ratings

- ✔ **AC:** 1/10 to 30A 600VAC, 100kA I.R.; 35 to 50A 600VAC, 10kA I.R.
- ✔ **DC:** 1/10 to 30A 500VDC, 100kA I.R.

Approvals

- ✔ UL Listed to Standard 248-14 (1/10 to 30A)
- ✔ DC listed to UL Standard 198L (1/10 to 30A)
- ✔ CSA Certified to Standard C22.2 No. 248.14 (1/10 to 30A)

Melting Time – Current Data 1/10 - 30/50 Amperes, 600 Volts AC



Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1/10	ATM1/10	L218303
1/8	ATM1/8	M219868
2/10	ATM2/10	X211137
1/4	ATM1/4	M219339
1/2	ATM1/2	A218822
3/4	ATM3/4	W213206
1	ATM1	W217277
1-1/2	ATM1-1/2	A217787
2	ATM2	Z201916
3	ATM3	L212691
4	ATM4	E215744
5	ATM5	K216255
6	ATM6	J216760
8	ATM8	B217788
10	ATM10	B222549
12	ATM12	Y200857
15	ATM15	L201398
20	ATM20	N211658
25	ATM25	V212170
30	ATM30	N213705
30/35	ATM30/35*	T214216*
30/40	ATM30/40*	X214725*
30/50	ATM30/50*	A215234*

*Not continuous current rated devices

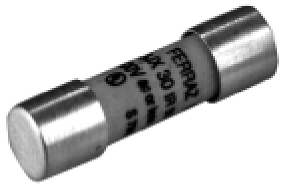
General Purpose Fuses

Midget Fuses

10.3 x 38 — 600VAC 500VDC Fast Acting 6JX

600 V AC / 500 V DC
100,000A I.R.
100 mA to 30 Amps
Current limiting

Ferraz Shawmut 6JX Midget Fuses are recommended for applications requiring very precise operating characteristics and where high available fault currents demand high interrupting capacities. Typical applications include control circuit, lighting circuit, small motor and control transformer protection.



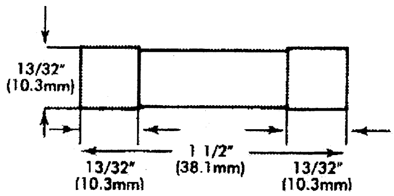
Part number explanation

6JX___
Ampere Rating

UL Listed
CSA Certified

Dimensions

100 mA	500 mA	2.5 A	6 A	12 A
125 mA	750 mA	3 A	7 A	15 A
200 mA	1 A	3.5 A	8 A	20 A
250 mA	1.5 A	4 A	9 A	25 A
300 mA	2 A	5 A	10 A	30 A

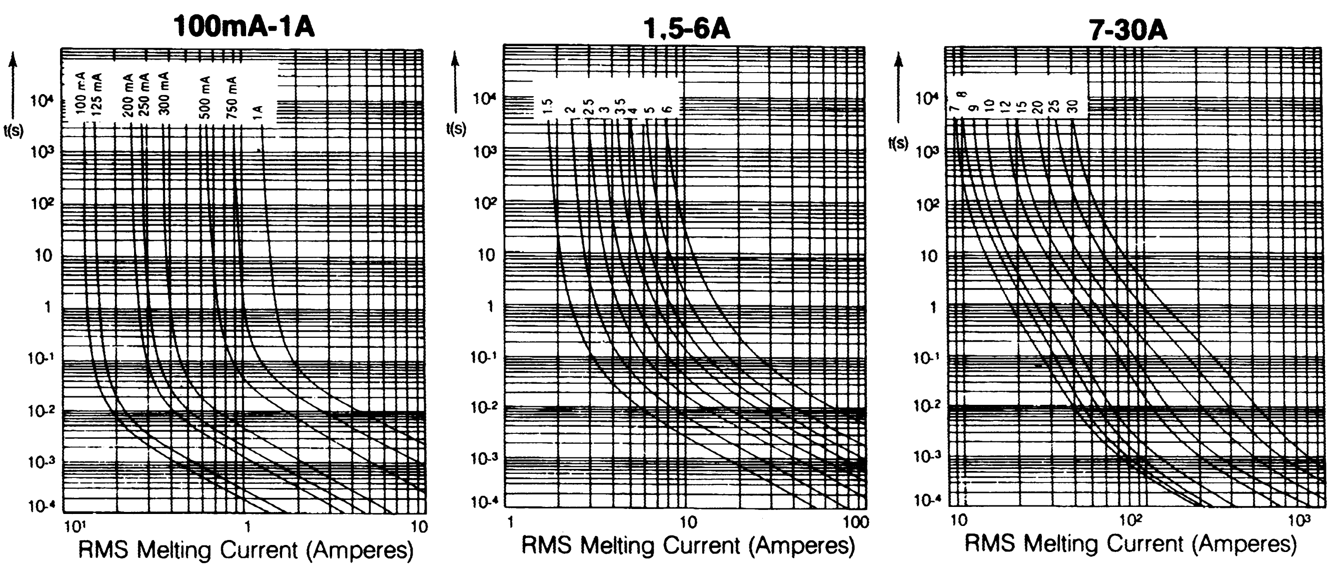


6JX fuses can be mounted in the UltraSafe™ fuse holder. Refer to Fuse Blocks and Fuse Holders section for details, Reference Number and Catalog Number.

Test specifications

I_{NF} = 110% I_N t ≥ 4 Hours
I_F = 135% I_N t ≤ 1 Hour
I_F = 200% I_N t ≤ 120 Sec.

Electrical Characteristics



Ferraz Shawmut

General Purpose Fuses

Midget Fuses

10.3 x 38 — 250VAC Time Delay TRM



Tri-onic® TRM time-delay midget fuses are rated 250 volts AC and are offered in 36 ampere ratings from 1/10A to 30A. They have 12 seconds time delay at 200% rating to provide supplemental protection of small motors, small transformers and other high inrush loads, plus many other 250 volt applications. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Numerous ratings** for a wide variety of applications
- ✔ **250VAC rating** in all sizes up to 30A
- ✔ **Time delay** for circuits with high inrush currrent
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Time Delay
- ✔ 250 VAC Rated

APPLICATIONS:

- ✔ Small Motors
- ✔ Small Transformers
- ✔ Lighting Circuits
- ✔ Control Circuits

Ratings

- ✔ **AC:** 1/10 to 30A 250VAC, 10kA I.R.

Approvals

- ✔ UL Listed to Standard 248-14
- ✔ CSA Certified to Standard C22.2 No. 248.14

Standard Fuse Ampere Ratings, Catalog Numbers

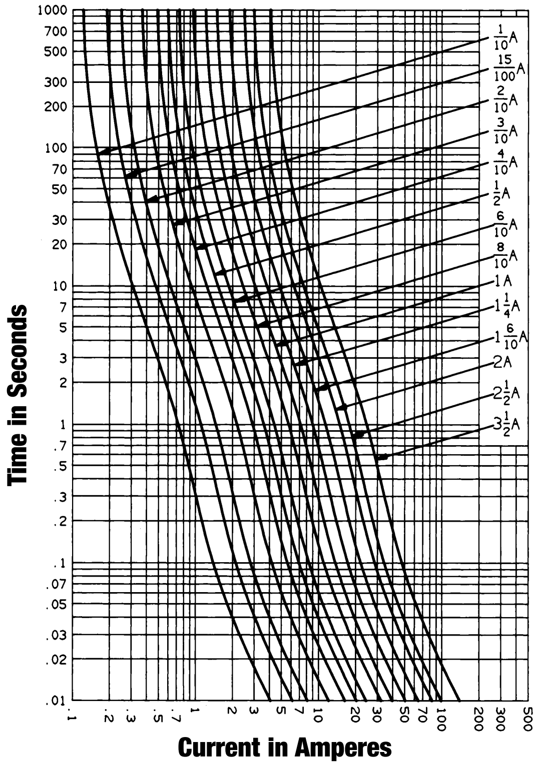
AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER	AMPERE RATING	CATALOG NUMBER
1/10	TRM1/10	6/10	TRM6/10	1-6/10	TRM1-6/10	3	TRM3	5-6/10	TRM5-6/10	10	TRM10
15/100	TRM15/100	8/10	TRM8/10	1-8/10	TRM1-8/10	3-2/10	TRM3-2/10	6	TRM6	12	TRM12
2/10	TRM2/10	1	TRM1	2	TRM2	3-1/2	TRM3-1/2	6-1/4	TRM6-1/4	15	TRM15
3/10	TRM3/10	1-1/8	TRM1-1/8	2-1/4	TRM2-1/4	4	TRM4	7	TRM7	20	TRM20
4/10	TRM4/10	1-1/4	TRM1-1/4	2-1/2	TRM2-1/2	4-1/2	TRM4-1/2	8	TRM8	25	TRM25
1/2	TRM1/2	1-4/10	TRM1-4/10	2-8/10	TRM2-8/10	5	TRM5	9	TRM9	30	TRM30

Standard Fuse Ampere Ratings, Reference Numbers

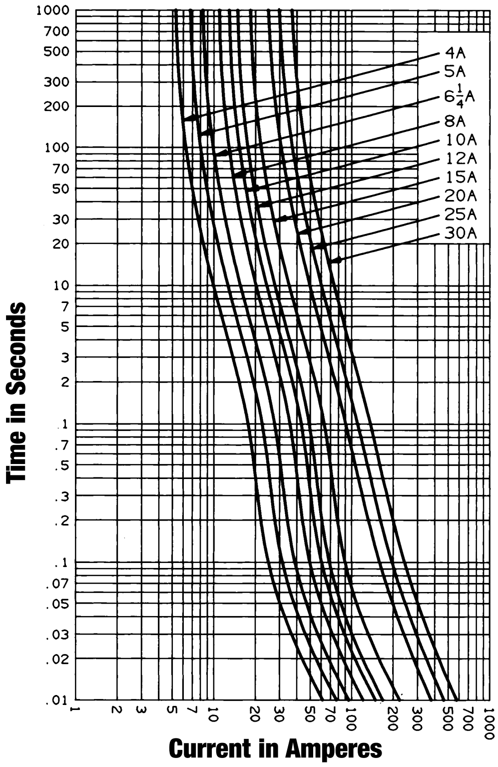
AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER
1/10	R217273	6/10	X222545	1-6/10	E216250	3	H213700	5-6/10	W218818	10	V218817
15/100	M223065	8/10	G201394	1-8/10	C216754	3-2/10	R214720	6	H219335	12	G219334
2/10	P212165	1	M214210	2	S200852	3-1/2	N214211	6-1/4	H219864	15	W222544
3/10	V215229	1-1/8	T215228	2-1/4	R211132	4	F216251	7	N223066	20	F212686
4/10	W217783	1-1/4	Q214719	2-1/2	T201911	4-1/2	D216755	8	T200853	25	Q213201
1/2	V217782	1-4/10	Y215738	2-8/10	H211653	5	G218299	9	V201912	30	Z215739

10.3 x 38 — 250VAC Time Delay TRM

Melting Time – Current Data 1/10 - 3-1/2 Amperes, 250 Volts AC



Melting Time – Current Data 4 - 30 Amperes, 250 Volts AC



General Purpose Fuses

Midget Fuses

10.3 x 38 250VAC Fast Acting OTM



One-time OTM midget fuses provide low-cost protection for 250 volt AC general purpose lighting, heating, control circuits, etc. where time delay is not required. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Low cost and fully rated** for economy without compromise
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ 250VAC Rated

APPLICATIONS:

- ✔ Supplemental protection of circuits up to 250VAC and 10kA

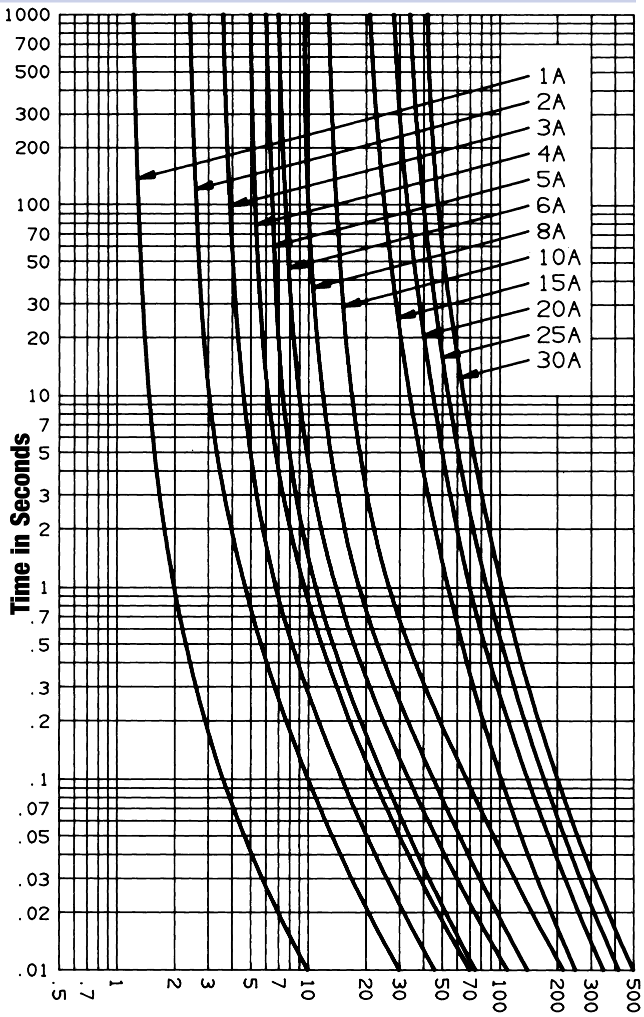
Ratings

- ✔ **AC:** 1 to 30A 250VAC, 10kA I.R.

Approvals

- ✔ UL Listed to Standard 248-14
- ✔ CSA Certified to Standard C22.2 No. 248.14

Melting Time – Current Data 1-30 Amperes, 250 Volts AC



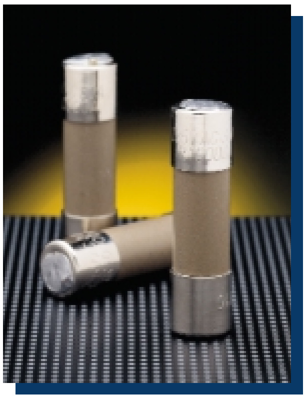
Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1	OTM1	E215721
2	OTM2	Y217256
3	OTM3	A218799
4	OTM4	N219846
5	OTM5	C222527
6	OTM6	T223048
8	OTM8	Z200835
10	OTM10	L216233
15	OTM15	J216737
20	OTM20	B217765
25	OTM25	M218281
30	OTM30	M219316

General Purpose Fuses

Midget Fuses

10.3 x 38 — 125VAC Fast Acting GGU



125 volt AC rated GGU fuses have midget fuse dimensions (1-1/2" long x 13/32" diameter). Ratings 3 through 15 amperes have glass bodies for easy checking of fuse link status. Ratings 20, 25, and 30 amperes have ceramic bodies, allowing use in higher ambient temperature conditions than other similar fuses. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Glass body on 3-15A** makes status of fusible element clearly visible
- ✔ **All ratings 125VAC** - higher than competitors
- ✔ **Ceramic body on 20-30A** allows use in higher temperature applications
- ✔ **Fast acting** for protection of circuits up to 30A and 125VAC
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Fast Acting

APPLICATIONS:

- ✔ General Purpose
- ✔ 125 Volt AC Circuits
- ✔ Supplemental Protection

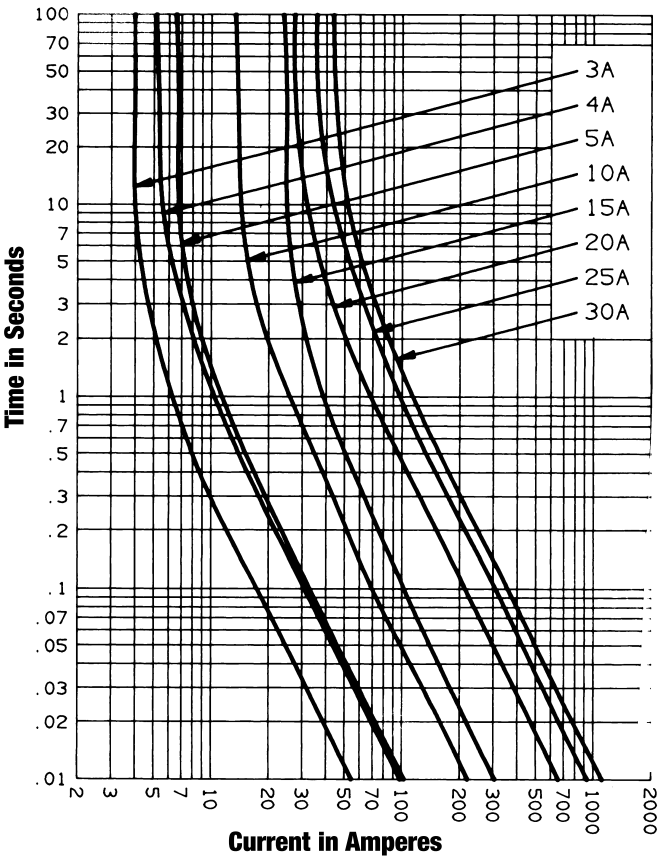
Ratings

- ✔ **AC:** 3 to 30A 125VAC, 10kA I.R.

Approvals

- ✔ UL Listed to Standard 248-14 (3 to 15A)
- ✔ UL Recognized Component Guide No. JDYX2 (20 to 30A)

Melting Time – Current Data 3-30 Amperes, 125 Volts AC



Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
3	GGU3	Q212442
4	GGU4	K213472
5	GGU5	E213973
8	GGU8	Q214489
10	GGU10	K201673
15	GGU15	S205475
20	GGU20	A211416
25	GGU25	C211924
30	GGU30	A212957

General Purpose Fuses

Midget Fuses

10.3 x 38 GFN



GFN midget indicating fuses are available in 34 ratings from 1/10A through 30A. These time-delay fuses have built-in blown fuse indicators which pop out at the end of the fuse to visually indicate when the fuse has operated to open the circuit. Indicators may be used to trip a switch for remote as well as visual indication. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Pin indicator** provides visual indication of open fuse or actuates switch for remote signaling
- ✔ **Numerous ratings** for a wide variety of applications
- ✔ **12 second time delay** at 200% rating
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Pin Indicating
- ✔ Time Delay

APPLICATIONS:

- ✔ For supplemental protection of circuits where time delay and blown fuse indication are required, such as solenoid circuits or control circuits.

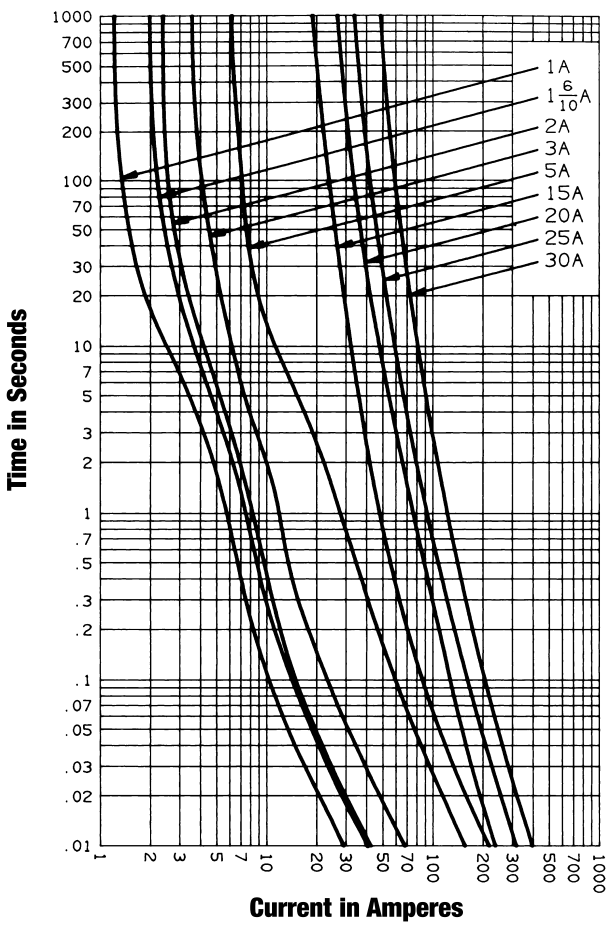
Ratings

- ✔ **AC:** 1/10 to 10A
  250VAC, 200A I.R.,
  125VAC, 10kA I.R.;
  12 to 15A
  125VAC, 10kA I.R.;
  20 to 30A
  32VAC, 10kA I.R.

Approvals

- ✔ UL Listed to Standard 248-14 (1/10 to 15A)
- ✔ CSA Certified to Standard C22.2 No.248.14 (1/10 to 15A)

Melting Time – Current Data 1 - 30 Amperes, 250 Volts AC



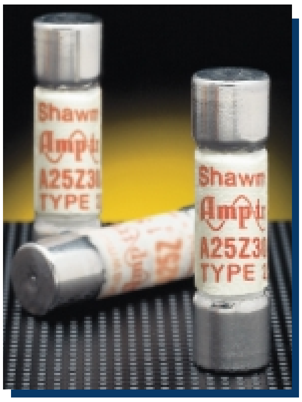
Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1/10	GFN1/10	K222557
1/8	GFN1/8	T201405
15/100	GFN15/10	-
2/10	GFN2/10	C214224
1/4	GFN1/4	G200865
3/10	GFN3/10	F217286
4/10	GFN4/10	X219348
1/2	GFN1/2	B223078
6/10	GFN6/10	H201924
8/10	GFN8/10	Y211667
1	GFN1	R216767
1-1/8	GFN1-1/8	V218311
1-1/4	GFN1-1/4	J217795
1-4/10	GFN1-4/10	H218829
1-1/2	GFN1-1/2	E217285
1-6/10	GFN1-6/10	W219347
1-8/10	GFN1-8/10	W219876
2	GFN2	V212699
2-1/4	GFN2-1/4	W213712
2-1/2	GFN2-1/2	E213214
3	GFN3	M215751
3-2/10	GFN3-2/10	S216768
3-1/2	GFN3-1/2	S216262
4	GFN4	W218312
4-1/2	GFN4-1/2	J218830
5	GFN5	L222558
6-1/4	GFN6-1/4	V201406
8	GFN8	F211145
10	GFN10	G201923
12	GFN12	E211144
15	GFN15	X211666
20	GFN20	F214733
25	GFN25	J215242
30	GFN30	J215242

General Purpose Fuses

Midget Fuses

10.3 x 38 — 300VAC A25Z-2



A25Z "Type 2" Amp-trap® midget fuses are primarily used for semiconductor protection. They have a 300 volt rating and are highly current-limiting fuses, with midget dimensions. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Extremely fast acting** for upgrades of existing circuit protection
- ✔ **Low I²t** for semiconductor protection
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ 300 Volt Rated
- ✔ Current Limiting
- ✔ I²t Rated

APPLICATIONS:

- ✔ Semiconductor Protection

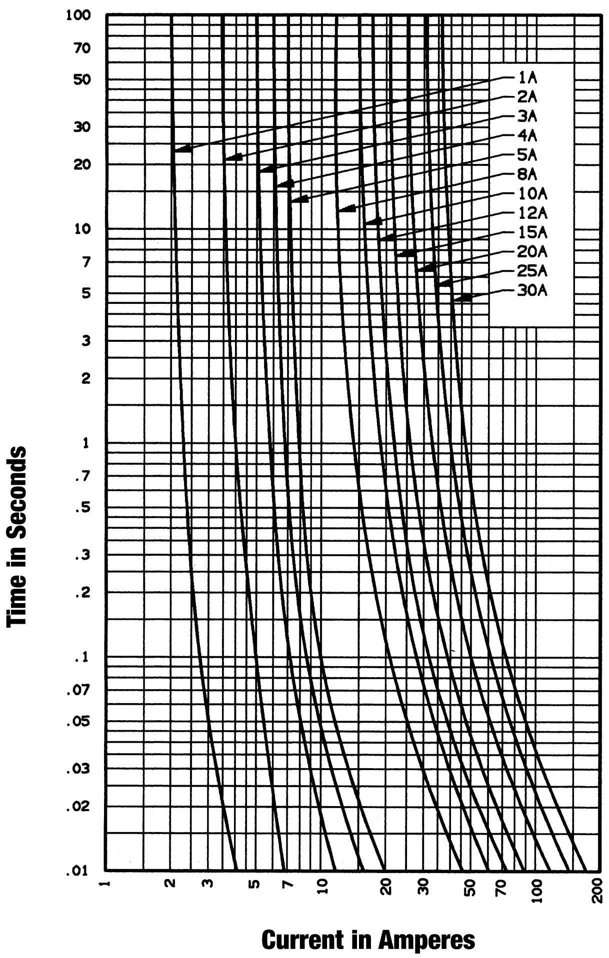
Ratings

- ✔ **AC:** 1 to 30A 300VAC, 100kA I.R.

Approvals

- ✔ Ferraz Shawmut Certified

Melting Time – Current Data 1 - 30 Amperes, 300 Volts AC



Standard Fuse Ampere Ratings, Clearing I²t

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	CLEARING I²t AT 250V
1	A25Z1-2	S211133	.27
2	A25Z2-2	R213202	1.5
3	A25Z3-2	S214721	3.4
4	A25Z4-2	A215740	6.9
5	A25Z5-2	G216252	8.7
8	A25Z8-2	E216756	26
10	A25Z10-2	J211654	40
12	A25Z12-2	Q212166	58
15	A25Z15-2	G212687	90
20	A25Z20-2	J213701	160
25	A25Z25-2	P214212	250
30	A25Z30-2	W215230	360

General Purpose Fuses

Midget Fuses

10.3 x 38

600VAC Fast Acting SBS



UNIQUE DIMENSIONS FOR TODAY'S SMALLER EQUIPMENT AND COMPONENTS

Fast-acting general purpose SBS fuses were developed in response to the industry's demand for smaller equipment and components. They are the only fuses in their size with a full 600 volt AC rating for all ampere ratings by Underwriters Laboratories standard 198G and CSA No. 59.2, and are the only fuses of this size with an interrupting rating of 100kA RMS, compared to 10kA on other brands. SBS fuses are 1-3/8" long, smaller by 1/8" than most standard midget fuses and are available in 22 ampere ratings, from 2/10A to 30A. (Not for Branch Circuit Protection).

Features/Benefits

- ✔ **Small unique physical size** for maximum design flexibility and non-interchangeability with other fuse classes
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial environments
- ✔ **UltraSafe™ fuse holder:** refer to Fuse Blocks and Fuse Holders section for details, Catalog Number and Reference Number

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ General Purpose
- ✔ Unique Dimensions

APPLICATIONS:

- ✔ Control Circuits
- ✔ Lighting Ballasts
- ✔ Meter Circuits
- ✔ Electronic Circuits

Ratings

- ✔ **AC:** 2/10 to 30A 600VAC, 100kA I.R.

Approvals

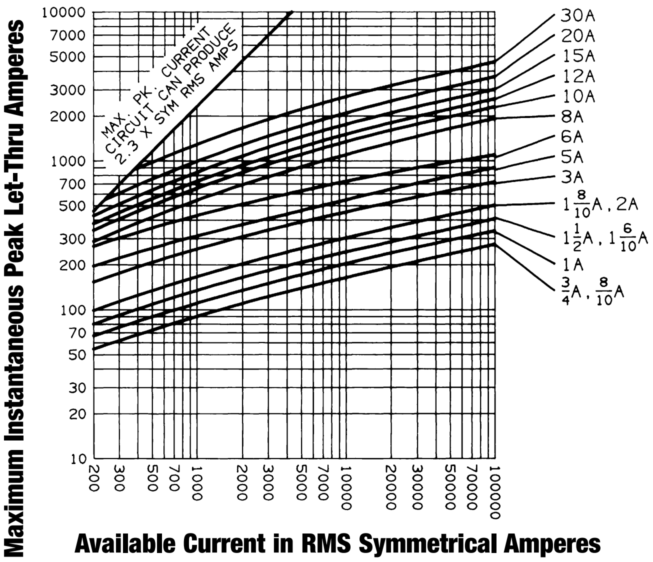
- ✔ UL Listed to Standard 248-14
- ✔ CSA Certified to Standard C22.2 No. 248.14

Standard Fuse Ampere Ratings, Reference Numbers

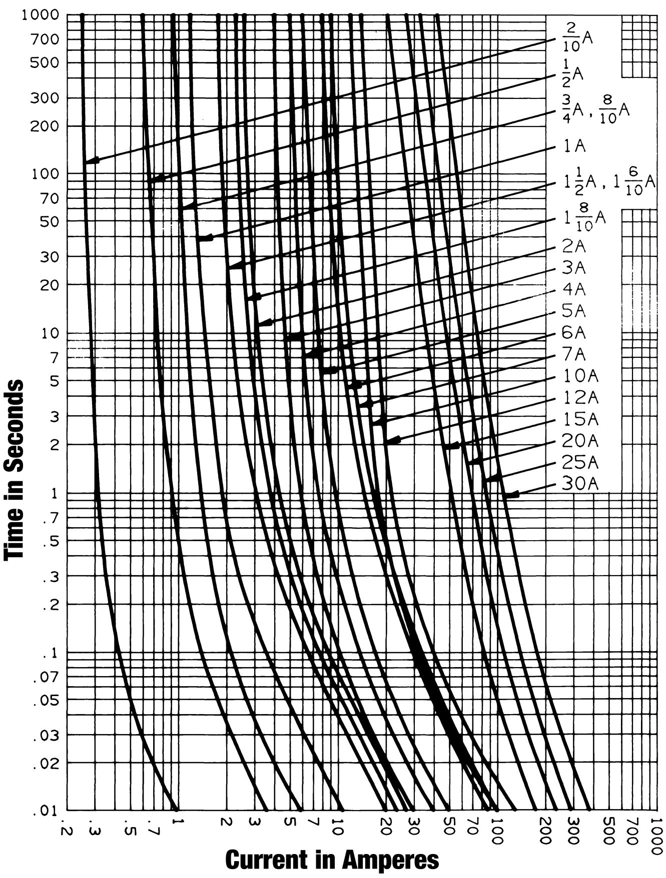
AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
2/10	SBS2/10	Y219349	4	SBS4	J201925
4/10	SBS4/10	G211146	5	SBS5	Z211668
1/2	SBS1/2	T216769	6	SBS6	E212179
3/4	SBS3/4	J200867	7	SBS7	X212701
8/10	SBS8/10	H214735	8	SBS8	E214226
1	SBS1	G214734	10	SBS10	G217287
1-1/2	SBS1-1/2	K215243	12	SBS12	G217287
1-6/10	SBS1-6/10	N215752	15	SBS15	X218313
1-8/10	SBS1-8/10	T216263	20	SBS20	X219877
2	SBS2	K218831	25	SBS25	M222559
3	SBS3	D223080	30	SBS30	W201407

Cross Reference: SBS will replace Bussmann BBS, Littelfuse BLS fuses

Peak Let-thru Current Data – 3/4 - 30 Amperes, 600 Volts AC



Melting Time – Current Data – 2/10 - 30 Amperes, 600 Volts AC



General Purpose Fuses

Midget Fuses

PC Mount

600VAC - 500VDC PCF



FAST ACTING FUSES FOR DIRECT MOUNTING ON PRINTED CIRCUIT BOARDS

Ferraz Shawmut's new PCF series of fast-acting direct-mountable fuses addresses the increasing need for electrical protection at the PC board as current and voltage requirements push higher. These fuses help printed circuit board manufacturers reduce parts by eliminating clips and fuse blocks and allowing automated assembly. PCF fuses can be used for the protection of main frame power boards, small circuit breakers with low interrupting ratings and other critical components. PCF fuses bring greatly increased ampere, voltage and interrupting ratings to the board itself and are UL Component Recognized.

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ PC Board Mount
- ✔ Three Mounting Styles

APPLICATIONS:

- ✔ Protection of main frame power boards, circuit breakers, components

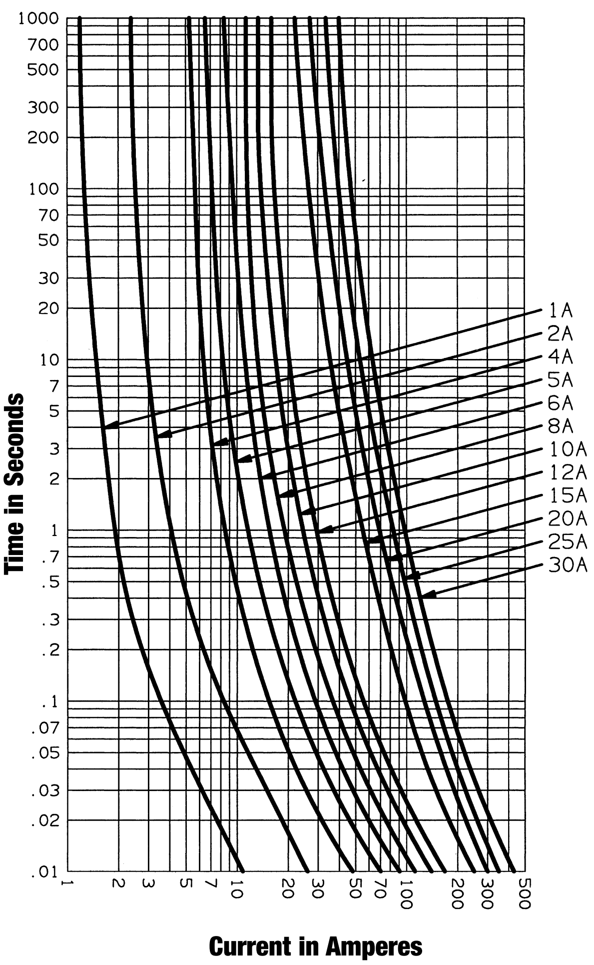
Ratings

- ✔ **AC:** 1 to 30A 600VAC, 100kA I.R.
- ✔ **DC:** 1 to 30A 500VDC, 100kA I.R. L/R 10ms

Approvals

- ✔ UL Recognized Components

Melting Time – Current Data



Standard Fuse Ampere Ratings, Ref. Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
Slot Mount		
1	PCF1-R	N212256
2	PCF2-R	V218909
3	PCF3-R	P212257
4	PCF4-R	F218390
5	PCF5-R	D219952
6	PCF6-R	G201486
7	PCF7-R	G211744
8	PCF8-R	P213292
10	PCF10-R	E213789
12	PCF12-R	T215826
15	PCF15-R	Q217364
20	PCF20-R	V222635
25	PCF25-R	F201485
30	PCF30-R	Q215317
Double Hole Mount		
1	PCF1-H	E211742
2	PCF2-H	E218389
3	PCF3-H	F211743
4	PCF4-H	Z217878
5	PCF5-H	K219429
6	PCF6-H	Q200942
7	PCF7-H	R211224
8	PCF8-H	C212775
10	PCF10-H	N213291
12	PCF12-H	N214809
15	PCF15-H	B216845
20	PCF20-H	C219951
25	PCF25-H	P200941
30	PCF30-H	F213790
Surface Mount		
1	PCF1-S	A212773
2	PCF2-S	J219428
3	PCF3-S	B212774
4	PCF4-S	W218910
5	PCF5-S	W222636
6	PCF6-S	T202026
7	PCF7-S	Q212258
8	PCF8-S	G213791
10	PCF10-S	N214303
12	PCF12-S	Y216336
15	PCF15-S	Y217877
20	PCF20-S	J223154
25	PCF25-S	Q211223
30	PCF30-S	V215827

For PCF series dimensions, refer to page 73

Ferraz Shawmut

General Purpose Fuses

Midget Fuses

PC Mount

600VAC - 600VDC PCS



SEMICONDUCTOR PROTECTION FUSES FOR DIRECT MOUNTING ON PRINTED CIRCUIT BOARDS

Ferraz Shawmut's new PCS series of extremely fast-acting, direct-mountable fuses addresses the increasing need for electrical protection at the PC board as current and voltage requirements push higher. These fuses help printed circuit board manufacturers reduce parts by eliminating clips and fuse blocks and allowing automated assembly. PCS fuses are AC and DC rated and are extremely current-limiting. They will protect semiconductors, main frame boards, circuit breakers with low interrupting rating and other critical components. PCS fuses bring I2t protection, higher voltage and interrupting ratings to the board itself and are UL Component Recognized.

HIGHLIGHTS:

- ✔ Extremely Fast Acting
- ✔ PC Board Mount
- ✔ Three Mounting Styles

APPLICATIONS:

- ✔ Protection of semiconductors, circuit breakers, critical components

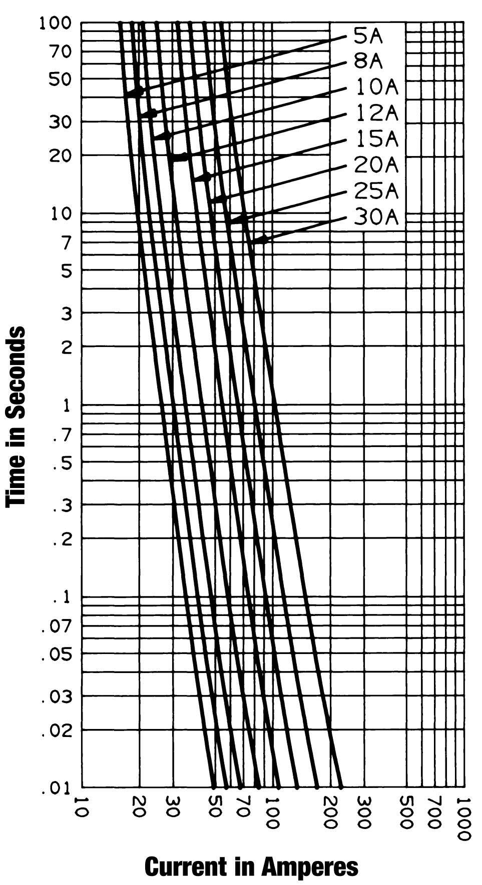
Ratings

- ✔ **AC:** 5 to 30A 600VAC, 200kA I.R.
- ✔ **DC:** 5 to 30A 600VDC, 100kA I.R. L/R ≤ 10 ms

Approvals

- ✔ UL Recognized Components

Melting Time – Current Data



Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
Slot Mount		
5	PCS5-R	B217880
8	PCS8-R	M219431
10	PCS10-R	Z216337
12	PCS12-R	A217879
15	PCS15-R	L219430
20	PCS20-R	K223155
25	PCS25-R	V202027
30	PCS30-R	R212259
Double Hole Mount		
5	PCS5-H	S217366
8	PCS8-H	Y218912
10	PCS10-H	P214304
12	PCS12-H	R217365
15	PCS15-H	X218911
20	PCS20-H	X222637
25	PCS25-H	H201487
30	PCS30-H	H211745
Surface Mount		
5	PCS5-S	H218392
8	PCS8-S	F219954
10	PCS10-S	C216846
12	PCS12-S	G218391
15	PCS15-S	E219953
20	PCS20-S	R200943
25	PCS25-S	S211225
30	PCS30-S	D212776

Dimensions of the PCS Series are found on page 73

General Purpose Fuses

Midget Fuses

PC Mount 600VAC - 600VDC PCS

I^2t at 600VDC,100kA, L/R = 10 ms

AMPERE RATING	CLEARING I^2t (A^2s)
5	40
8	42
10	70
12	90
15	110
20	200
25	260
30	520

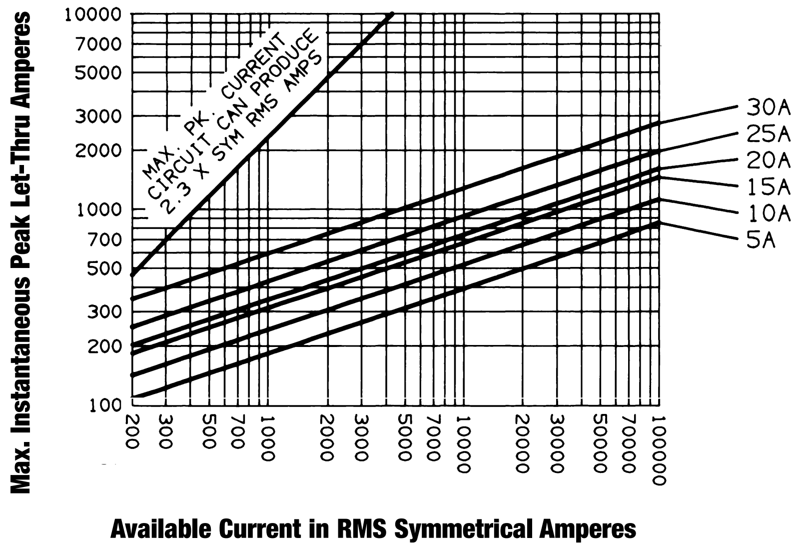
I^2t at 600VAC, 100kA

AMPERE RATING	MELTING I^2t (A^2s)	CLEARING I^2t (A^2s)
5	5	60
8	6.5	70
10	10	110
12	17	150
15	26	180
20	41	330
25	69	440
30	132	860

Watts Loss Data

AMPERE RATING	WATTS LOSS @ 80% RATING (w)	WATTS LOSS @ 100%RATING (w)
5	0.5	0.7
10	0.9	1.5
15	1.9	3.0
20	2.6	4.4
25	2.9	5.3
30	3.0	5.8

Peak Let-Thru Current Data – PCS5 to 30-R, H or S, 600 Volts AC



General Purpose Fuses

Midget Fuses

PC Mount — 500VAC PCT



TIME DELAY FUSES FOR DIRECT MOUNTING ON PRINTED CIRCUIT BOARDS

Ferraz Shawmut's new PCT series of time-delay, direct-mountable fuses addresses the increasing need for electrical protection at the PC board as current and voltage requirements push higher. These fuses help printed circuit board manufacturers reduce parts by eleminiating clips and fuse blocks and allowing automated assembly. PCT fuses can be used for the protection of main frame power boards, small circuit breakers with low interrupting ratings and other components. PCT fuses bring protection with time delay, greatly increased ampere, voltage and interrupting ratings to the board itself and are UL Component Recognized

HIGHLIGHTS:

- ✔ Time Delay
- ✔ PC Board Mount
- ✔ Three Mounting Styles

APPLICATIONS:

- ✔ Protection of main frame power boards, circuit breakers, components

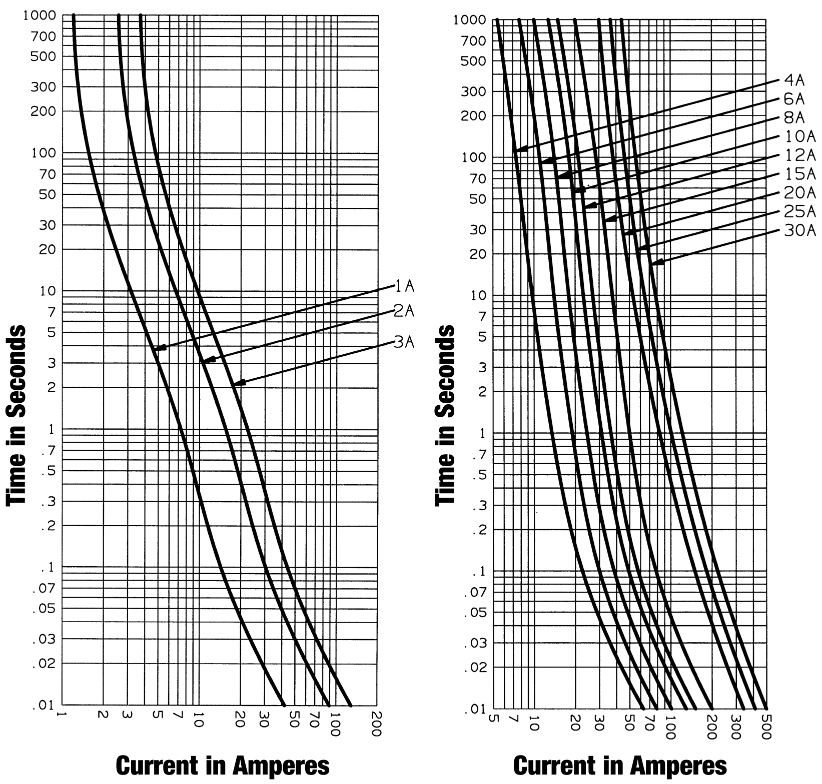
Ratings

- ✔ **AC:** 1 to 30A 500VAC, 100kA

Approvals

- ✔ UL Recognized Components

Melting Time – Current Data



AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
Slot Mount		
1	PCT1-R	L223156
2	PCT2-R	S215319
3	PCT3-R	Z222639
4	PCT4-R	K211747
5	PCT5-R	S213295
6	PCT6-R	Q214811
7	PCT7-R	C216340
8	PCT8-R	D217882
10	PCT10-R	D202081
12	PCT12-R	S212260
15	PCT15-R	J213793
20	PCT20-R	T217367
25	PCT25-R	Z218913
30	PCT30-R	K201489
Double Hole Mount		
1	PCT1-H	Y222638
2	PCT2-H	P214810
3	PCT3-H	G219955
4	PCT4-H	V211227
5	PCT5-H	F212778
6	PCT6-H	S214307
7	PCT7-H	X215829
8	PCT8-H	V217368
10	PCT10-H	J201488
12	PCT12-H	J211746
15	PCT15-H	R213294
20	PCT20-H	D216847
25	PCT25-H	J218393
30	PCT30-H	T200945
Surface Mount		
1	PCT1-S	S200944
2	PCT2-S	B216339
3	PCT3-S	M223157
4	PCT4-S	T212261
5	PCT5-S	K213794
6	PCT6-S	T215320
7	PCT7-S	E216848
8	PCT8-S	K218394
10	PCT10-S	T211226
12	PCT12-S	E212777
15	PCT15-S	R214306
20	PCT20-S	C217881
25	PCT25-S	N219432
30	PCT30-S	N202090

For PCT series dimensions, refer to page 73

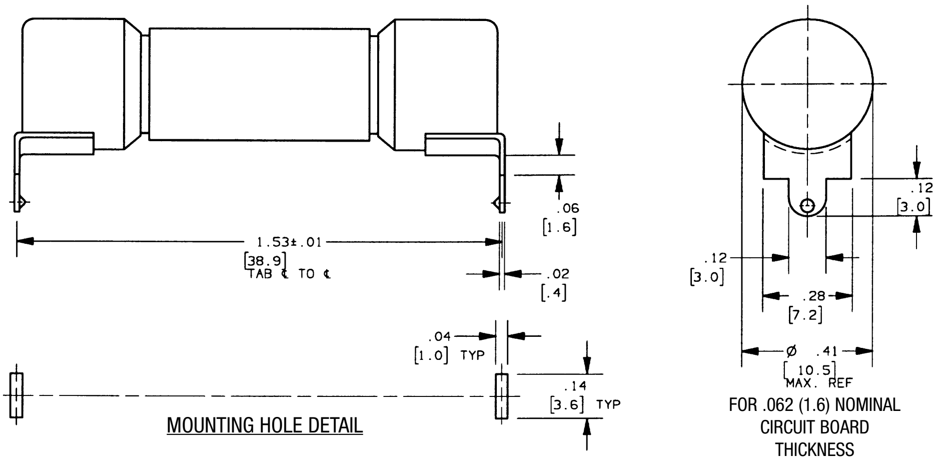
PC Mount

PCF, PCS, PCT Series

Outline Dimensions

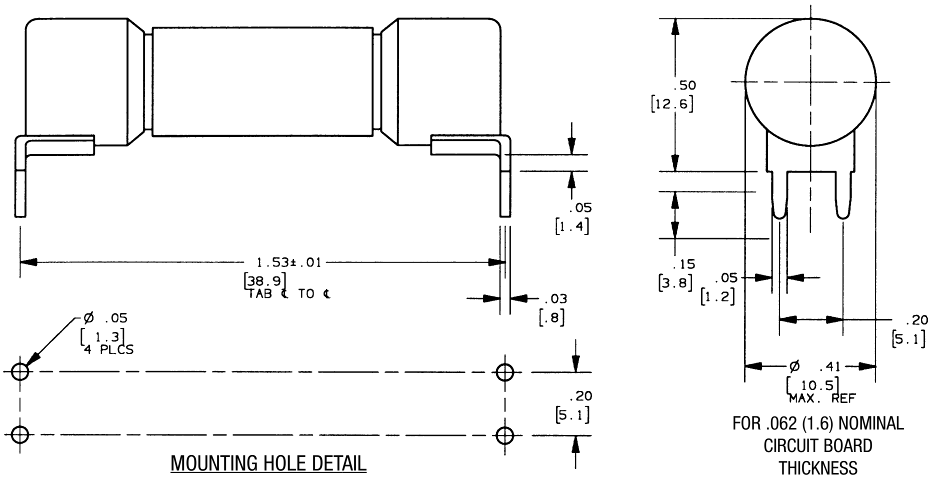
Slot Mount (Rectangular Holes) "R" terminal

PCF1-R thru PCF30-R
PCS5-R thru PCS30-R
PCT1-R thru PCT30-R



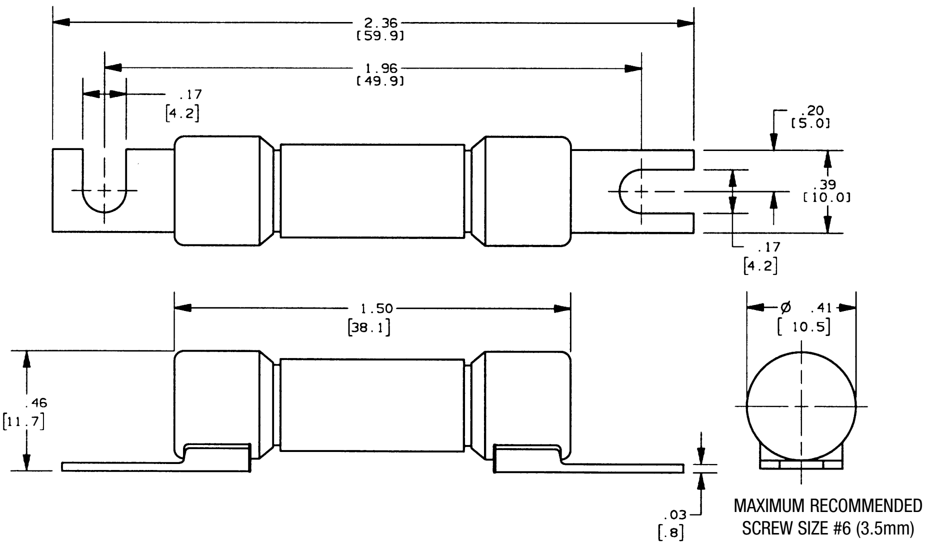
Double Hole Mount (Round Holes) "H" terminal

PCF1-H thru PCF30-H
PCS5-H thru PCS30-H
PCT1-H thru PCT30-H



Surface (Screw) Mount "S" terminal

PCF1-S thru PCF30-S
PCS5-S thru PCS30-S
PCT1-S thru PCT30-S



General Purpose Fuses

French Ferrule

gG, aM



DOMESTIC AND INDUSTRIAL CYLINDRICAL FUSE-LINKS

Ferraz Shawmut gF, gI-gG and aM fuse-links cover a wide range of physical sizes and ampere ratings for 250, 380*, 400, 500, and 660* volts AC. gF fuse-links are for domestic use. gI-gG and aM fuse-links are for industrial applications. Most ratings are available with an optional indicator. All industrial fuse-links have the option of a built-in striker. All cylindrical fuse-links have ceramic bodies and silver-plated ferrules.

* Fuse-links marked 380V (gF) and 660V (gI-gG-aM) will be re-marked (and safely used at) 400V AC and 690V AC in compliance with changes in IEC Standard 269, but should not be used above 418V AC or 726V AC.

gF

FULL RANGE PROTECTION

- ✔ 7 physical sizes from 6.3 x 23mm to 10.3 x 38 mm
- ✔ 250 and 380 Volt ratings - 0.5A through 32A
- ✔ Most ratings available with indicator
- ✔ Meet IEC, NFC, UNE and British standards
- ✔ See residential fuse-links, Special Purpose section

gI-gG

FULL RANGE PROTECTION

- ✔ 4 physical sizes from 8 x 31mm to 22 x 58 mm
- ✔ 400, 500 and 690 Volt ratings - 0.5A through 125A
- ✔ Most ratings available with indicator
- ✔ Meet IEC, NFC and UNE standards
- ✔ Approved by Lloyds Register of Shipping and Bureau Veritas

gI-gG

FULL RANGE PROTECTION

Fuse-links with striker

- ✔ 2 sizes- 14 x 51mm and 22 x 58mm
- ✔ 400, 500 and 690 Volt ratings - 4A through 125A
- ✔ All ratings include striker
- ✔ Meet IEC, NFC and UNE standards
- ✔ Approved by Lloyds Register of Shipping and Bureau Veritas

aM

SHORT CIRCUIT PROTECTION

- ✔ 4 physical sizes from 8 x 31mm to 22 x 58mm
- ✔ 400, 500 and 690 Volt ratings - 0.16A through 125A
- ✔ Most ratings available with indicator
- ✔ Meet IEC, NFC and UNE standards
- ✔ Approved by Lloyds Register of Shipping and Bureau Veritas

aM

SHORT CIRCUIT PROTECTION

Fuse-links with striker

- ✔ 2 sizes - 14 x 51mm and 22 x 58mm
- ✔ 400, 500 and 690 Volt ratings - 2A through 125A
- ✔ All ratings include striker
- ✔ Meet IEC, NFC and UNE standards
- ✔ Approved by Lloyds Register of Shipping and Bureau Veritas

General Purpose Fuses

French Ferrule

gI, gG

Ratings – gI-gG (Optional Blown-Fuse Indicator)



F217677



D211028



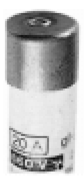
C213603



Q217180

SIZE (mm x mm)	RATED In CURRENT (A)	RATED VOLTAGE	CATALOG NUMBER w/o Indicator	CATALOG NUMBER w/Indicator	REFERENCE NUMBER w/o Indicator	REFERENCE NUMBER w/Indicator	INTERRUPTING RATING (A)	STANDARD PACK/CTN.
8 x 31	0.5	400V	15009	-	P218191	-	20kA - 400V	10
	1		15011	-	C218709			
	2		15013	15213	Q219227	B222204		
	4		15019	15219	W222958	X222959		
	6		15023	15223	A211025	V201291		
	8		15027	15227	B213096	B211026		
	10		15031	15231	A214613	A212060		
	12		15033	15233	R216146	C213097		
	16		15035	15235	P216650	Y214105		
	20		15037	15237	F217677	J215127		
	25		15039	15239	D218710	S216147		
10 X 38	0.5	500V	16009	-	C211027	-	120kA - 500V	10
	1		16011	-	B212061	-		
	2		16013	16213	D213098	S216653		
	4		16019	16219	X213598	E217170		
	6		16023	16223	K215128	T218195		
	8		16027	16227	D217169	V219231		
	10		16031	16231	S218194	E222207		
	12		16033	16233	W219761	H200751		
	16		16035	16235	G200750	H201809		
	20		16037	16237	D211028	X211551		
	25		16039	16239	E213099	W212585		
	32	400V	16043	16243	A214107	Z213600	120kA - 400V	
14 X 51	1	690V	17011	-	K218716	-	80kA - 690V	10
	2		17013	17213	Y219234	C201298		
	4		17019	17219	A219765	H211032		
	6		17023	17223	H222210	G212066		
	8		17027	17227	D222965	K213104		
	10		17031	17231	L200754	H214620		
	12		17033	17233	L201812	R215640		
	16		17035	17235	A211554	X216657		
	20		17037	17237	Z212588	N217684		
	25		17039	17239	C213603	M218718		
	32	500V	17043	17243	W216656	C219767	120kA - 500V	
	40	500V	17047	17247	X218198	F222967	120kA - 500V	
	50	400V	17051	17251	Z219235	D201299	120kA - 400V	
22 x 58	4	690V	18013	-	F219241	-	80kA - 690V	10
	4		18019	18219	H219772	Q211039		
	6		18023	18223	P222216	P212073		
	8		18027	18227	L222972	R213110		
	10		18031	18231	T200761	N214119		
	12		18033	18233	J201304	Y215140		
	16		18035	18235	S201818	D216157		
	20		18037	18237	P211038	R217181		
	25		18039	18239	N212072	F218206		
	32		18043	18243	F212594	H219243		
	40		18047	18247	J213609	R222218		
	50		18051	18251	P214626	W200763		
	63		18055	18255	Y215646	V201820		
	80		18059	18259	Q217180	K211563		
	100	500V	18063	18263	E218205	H212596	120kA -500V	
	125	400V	18065	18265	J219773	L213611	120kA -400V	

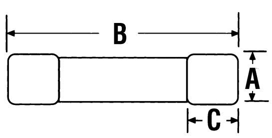
Blown-Fuse Indicator



BEFORE



AFTER



Dimensions

FUSE SIZE	A	B	C
8 x 31	8.5	31.5	6.3
10 x 38	10.3	38	10.5
14 x 51	14.3	51	13.8
22 x 58	22.2	58	16.2

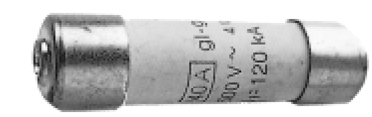
General Purpose Fuses

French Ferrule

gG with striker

Ratings – gI-gG with Striker

SIZE (mm x mm)	RATED CURRENT In (A)	RATED VOLTAGE	CATALOG NUMBER	REFERENCE NUMBER	INTERRUPTING RATING (A)	STANDARD PACK/CTN.
14 X 51	2	500V	17413	J211033	120kA - 500V	10
	4		17419	H212067		
	6		17423	G214113		
	8		17427	R215134		
	10		17431	Z216153		
	12		17433	L217176		
	16		17435	Z218200		
	20		17437	B219237		
	25		17439	L222213		
	32		17443	P200757		
	40		17447	P201815		
	50	400V	17451	D211557	120kA - 400V	
22 X 58	4	690V	18419	R214628	80kA - 690V	10
	6		18423	A215648		
	8		18427	F216665		
	10		18431	W217691		
	12		18433	W218726		
	16		18435	L219775		
	20		18437	P222975		
	25		18439	M201307		
	32		18443	S211041		
	40		18447	R212075		
	50		18451	M213612		
	63	500V	18455	S214629	120kA - 500V	
	80		18459	F216159		
	100		18463	T217183		
	125	400V	18465	H218208	120kA - 400V	



P201815



R212075

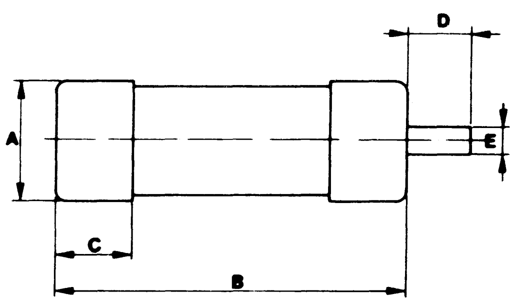
Striker



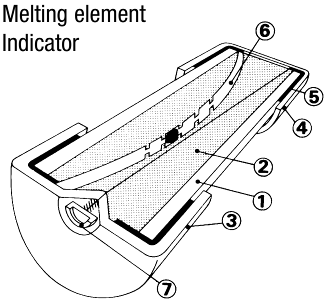
BEFORE **AFTER**

Dimensions

FUSE SIZE	A	B	C	D	E
14 x 51	14.3	51	13.8	7.5	3.8
22 x 58	22.2	58	16.2	7.5	3.8



1. Ceramic body
2. Sand
3. Indicator contact
4. Lower contact
5. Contact ring
6. Melting element
7. Indicator

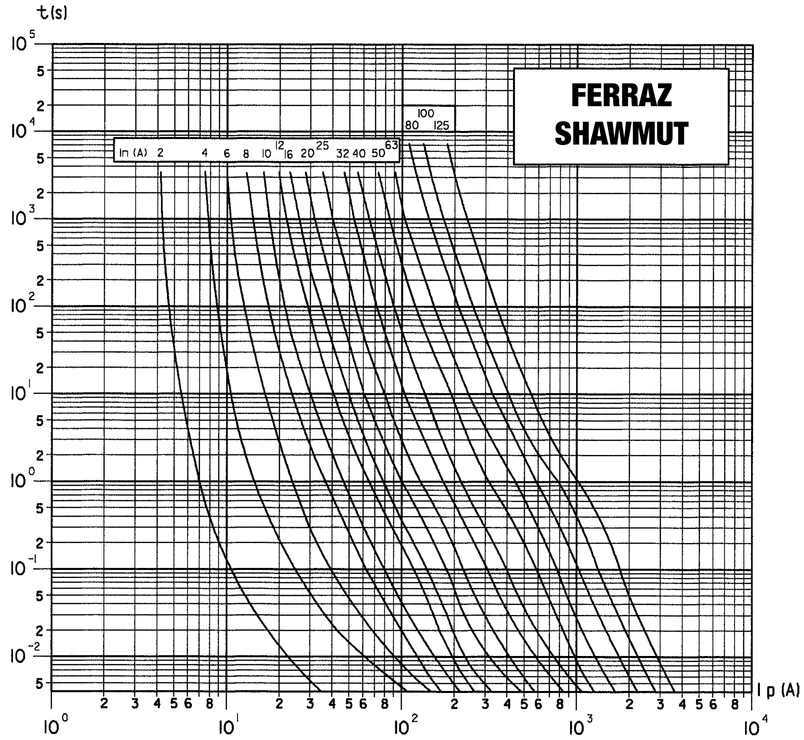


General Purpose Fuses

French Ferrule

gG

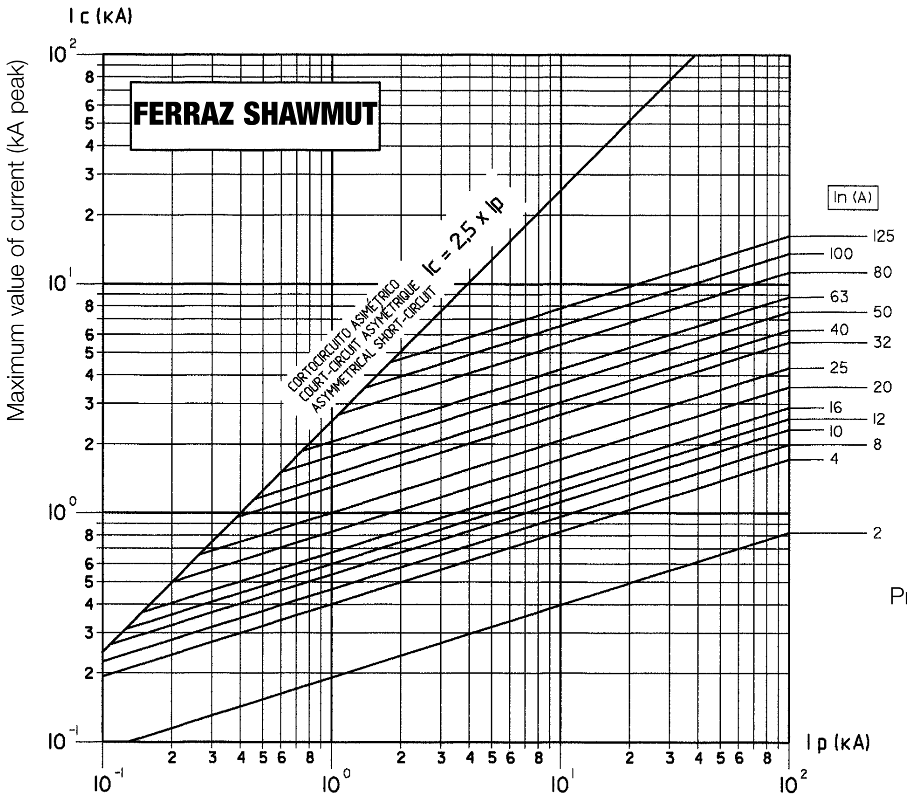
Characteristics t-I



gG

Prospective current (r.m.s. A)

Cut-off characteristics



Prospective current (KA eff)

gG

Characteristics I²t

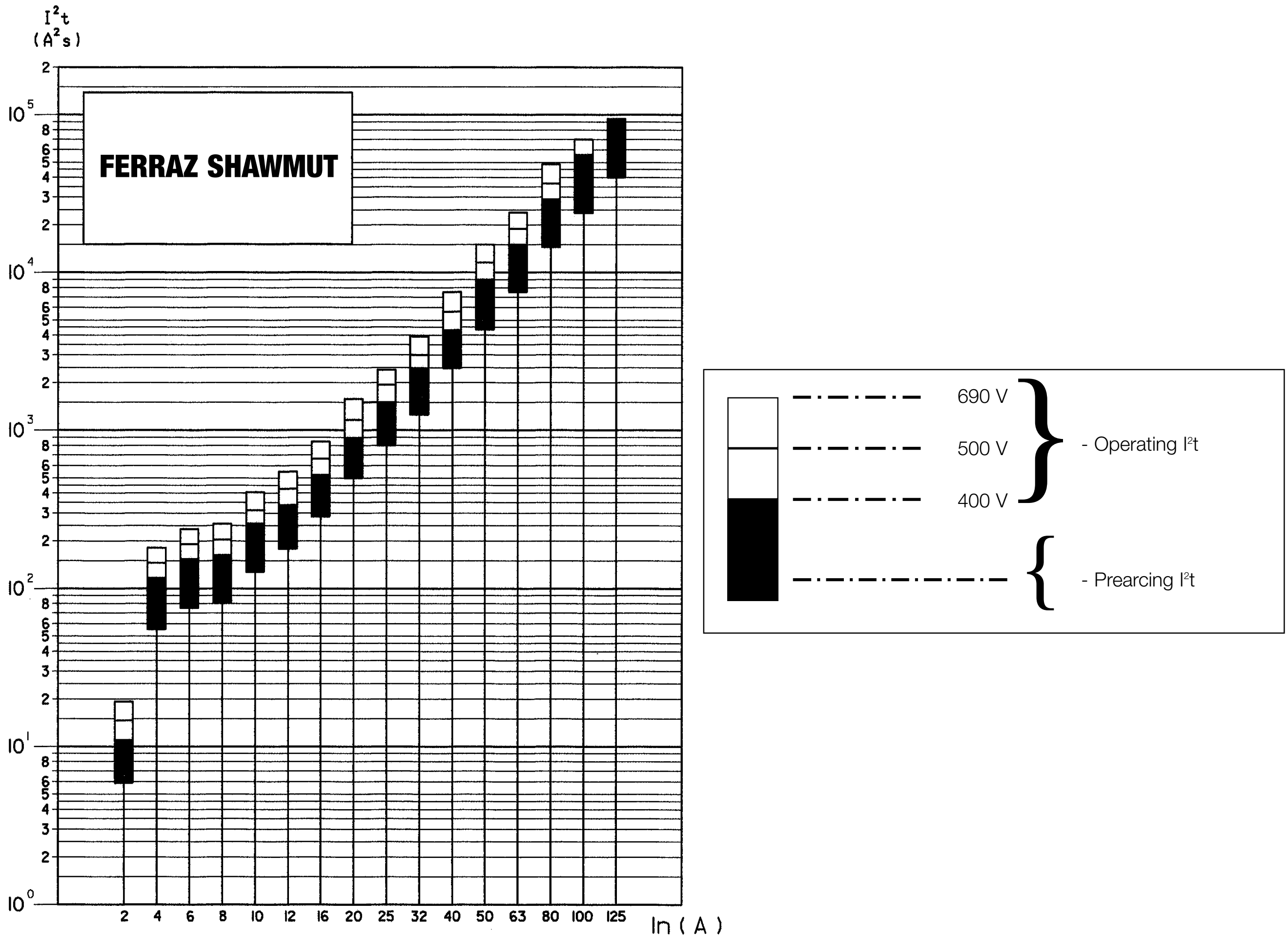
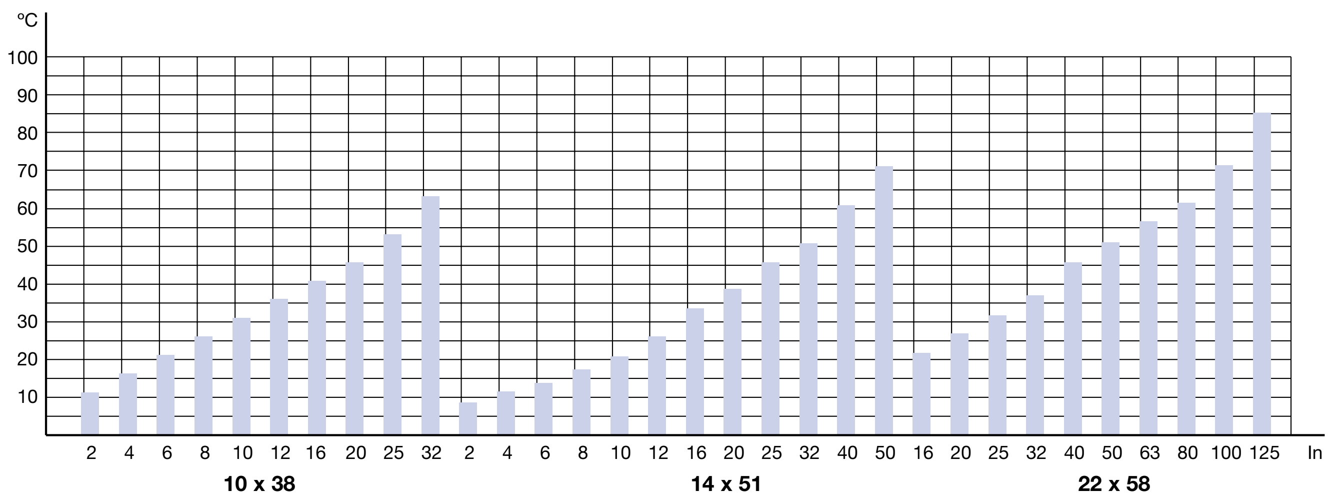


Table temperature increase (testing in superior contact)



gG

Power loss table

In	Size		
	10 x 38	14 x 51	22 x 58
0,5 A	0,20 W		
1 A	0,60 W	0,80 W	
2 A	0,70 W	1 W	1,20 W
4 A	0,80 W	1,10 W	1,30 W
6 A	0,90 W	1,20 W	1,40 W
8 A	1,10 W	1,50 W	1,65 W
10 A	1,35 W	1,80 W	2 W
12 A	1,55 W	2,10 W	2,40 W
16 A	1,90 W	2,55 W	3 W
20 A	2,30 W	3 W	3,40 W
25 A	2,80 W	3,50 W	3,80 W
32 A	3 W	3,80 W	4,30 W
40 A		4,40 W	5,10 W
50 A		4,7 W	5,50 W
63 A			6,70 W
80 A			8 W
100 A			9 W
125 A			12,5 W

IEC 269-2-1 NFC 63.213 UNE 21.103-2-1	10 x 38	14 x 51	22 x 58
	25 A	40 A	100 A
	3 W	5 W	9,5 W

Table of maximum longitudes of network in function of In and conductor section

gG CLASS FUSES

Copper conductor section (mm²)	RATED CURRENT (In) OF gG FUSES (in A)									
	16	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
1,5	99/113	86/87	40/59	21/29	13/16	7/9				
2,5		134	110/122	67/84	41/51	25/33	13/20	8/11		
4			183	139	108/119	67/84	46/58	24/32	14/17	7,3/10
6				214	165	139	94/113	55/70	33/41	20/27
10					275	226	172	130	90/108	57/70
16							283	217	168	128
25								336	257	197
35									367	283
50										379

* 99/118:
- 99; Cond. PVC / 118; Cond. PRC

General Purpose Fuses

French Ferrule

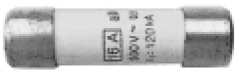
aM

Ratings – aM (Optional Blown-Fuse Indicator)

SIZE (mm x mm)	RATED In CURRENT (A)	RATED VOLTAGE	CATALOG NUMBER w/o Indicator	CATALOG NUMBER w/Indicator	REFERENCE NUMBER w/o Indicator	REFERENCE NUMBER w/Indicator	INTERRUPTING RATING (A)	STANDARD PACK/CTN.
8 x 31	1	400V	15511	-	C217168	-	20kA - 400V	10
	2		15513	-	R218193	-		
	4		15519	-	S219229	-		
	6		15523	-	C222205	-		
	8		15527	-	F200749	-		
	10		15531	-	W201292	-		
10 X 38	0.16	500V	16503	-	E214617	-	120kA - 500V	10
	0.25		16507	-	M215130	-		
	0.5		16509	-	W216150	-		
	1		16511	16711	F217171	X219233		
	2		16513	16713	H218714	G222209		
	4		16519	16719	W219232	K200753		
	6		16523	16723	F222208	K201811		
	8		16527	16727	Z201295	Z211553		
	10		16531	16731	Y211552	H213102		
	12		16533	16733	A213601	D214110		
	16		16535	16735	F214618	P215132		
	20		16537	16737	X216151	V216655		
	25	400V	16539	16739	G217172	L217682	120kA - 400V	
	32	400V	16543	-	J218715	-	120kA - 400V	
14 X 51	0.25	690V	17507	-	B212590	-	80kA - 690V	10
	0.5		17509	-	L213105	-		
	1		17511	17711	E213605	C212591		
	2		17513	17713	H214114	M213106		
	4		17519	17719	K214622	J214115		
	6		17523	17723	S215135	T215136		
	8		17527	17727	T215642	A216660		
	10		17531	17731	Z216659	R217687		
	12		17533	17733	M217177	Q218721		
	16		17535	17735	Q217686	F219770		
	20		17537	17737	P218720	R200759		
	25		17539	17739	E219769	Q201816		
	32	500V	17543	17743	M222214	F211559	120kA - 500V	
	40		17547	17747	Q200758	D212592		
	45		17549	17749	L211035	G213607		
	50	400V	17551	17751	E211558	M214624	120kA - 400V	
22 x 58	1	690V	18511	-	M219776	-	80kA - 690V	10
	2		18513	-	T222220	-		
	4		18519	18719	Q222976	L219246		
	6		18523	18723	Y200765	V222221		
	8		18527	18727	N201308	Y201823		
	10		18531	18731	X201822	N211566		
	12		18533	18731	T211042	K212598		
	16		18535	18735	M211565	P213614		
	20		18537	18737	S212076	V214631		
	25		18539	18739	J212597	D215651		
	32		18543	18743	V213113	J216668		
	40		18547	18747	N213613	Z217694		
	50		18551	18751	R214122	P219778		
	63		18555	18755	C215650	Z200766		
	80		18559	18759	H216667	P211567		
	100	500V	18563	18763	Y217693	L212599	120kA - 500V	
	125	400V	18565	18765	J218209	W214632	120kA - 400V	



S219229



F214618



Q217686



C215650

Blown-Fuse Indicator

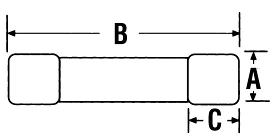


BEFORE



AFTER

Dimensions

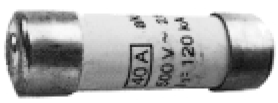


FUSE SIZE	A	B	C
8 x 31	8.5	31.5	6.3
10 x 38	10.3	38	10.5
14 x 51	14.3	51	13.8
22 x 58	22.2	58	16.2

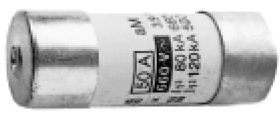
General Purpose Fuses

French Ferrule

aM with striker



X215645



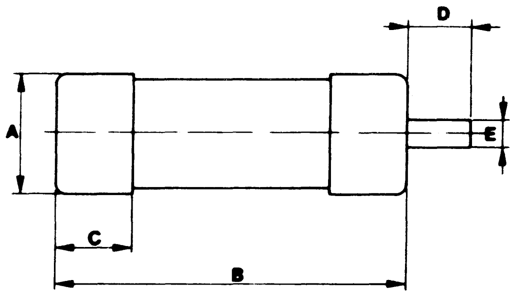
K216669

Ratings – aM with Striker

SIZE (mm x mm)	RATED In CURRENT (A)	RATED VOLTAGE	CATALOG NUMBER	REFERENCE NUMBER	INTERRUPTING RATING (A)	STANDARD PACK/CTN.
	1	500V	17911	W215644	120kA 500V	
	2	↓	17913	B216661	↓	
	4		17919	C218203		
	6		17923	E219240		
	8		17927	N222215		
	10		17931	S200760		
14 X 51	12		17933	R201817		10
	16		17935	G211560		
	20		17937	E212593		
	25		17939	H213608		
	32		17943	N214625		
	40		17947	X215645		
	45		17949	C216662		
	50	400V	17951	D218204	120kA - 400V	
	1	690V	18911	E215652	80kA - 690V	
	2	↓	18913	J216162	↓	
	4		18919	A217695		
	6		18923	Y218728		
	8		18927	Q219779		
	10		18931	S222978		
	12		18933	R201311		
	16		18935	W211044		
22 X 58	20		18937	W212079		10
	25		18939	Q213615		
	32		18943	X214633		
	40		18947	F215653		
	50		18951	K216669		
	63	500V	18955	B217696	120kA - 500V	
	80	↓	18959	Z218729	↓	
	100		18963	T222979		
	125	400V	18965	S201312	120kA - 400V	

Dimensions

FUSE SIZE	A	B	C	D	E
14 x 51	14.3	51	13.8	7.5	3.8
22 x 58	22.2	58	16.2	7.5	3.8



Striker



BEFORE AFTER

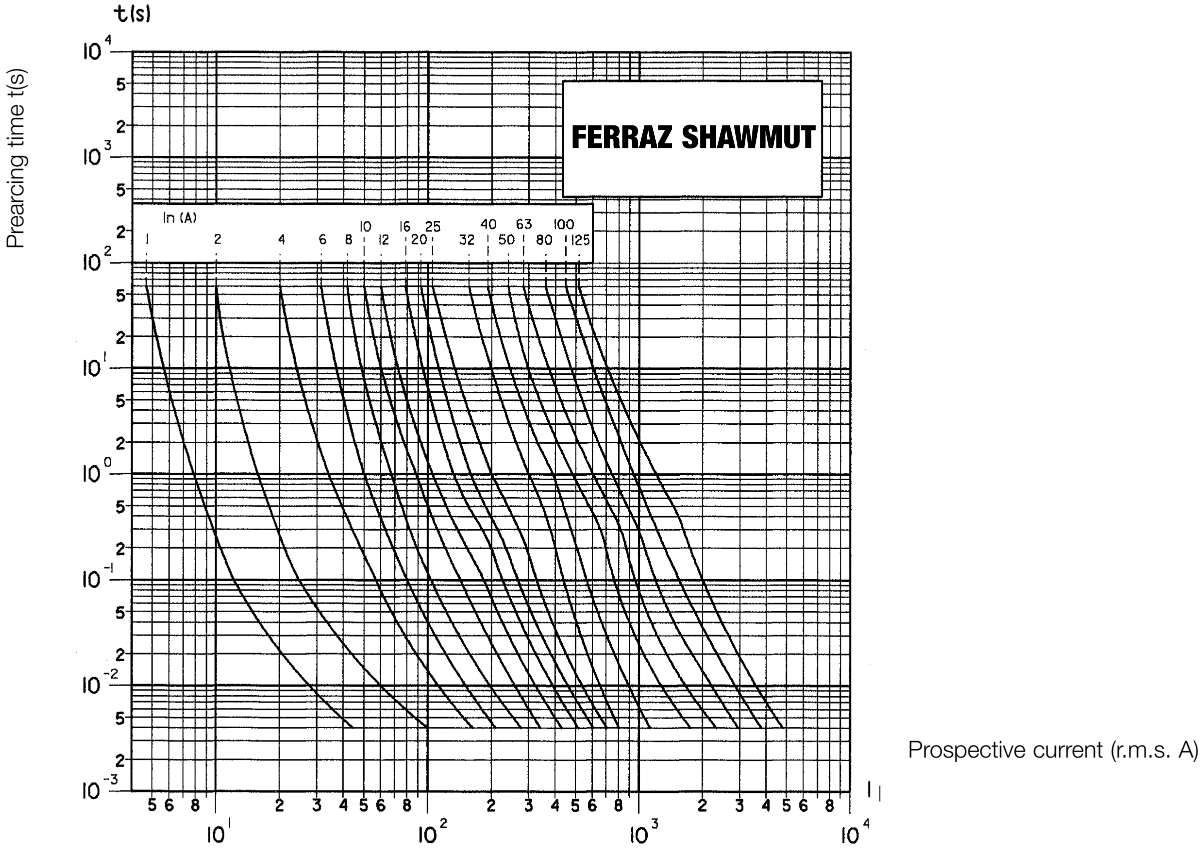
Ferraz Shawmut

General Purpose Fuses

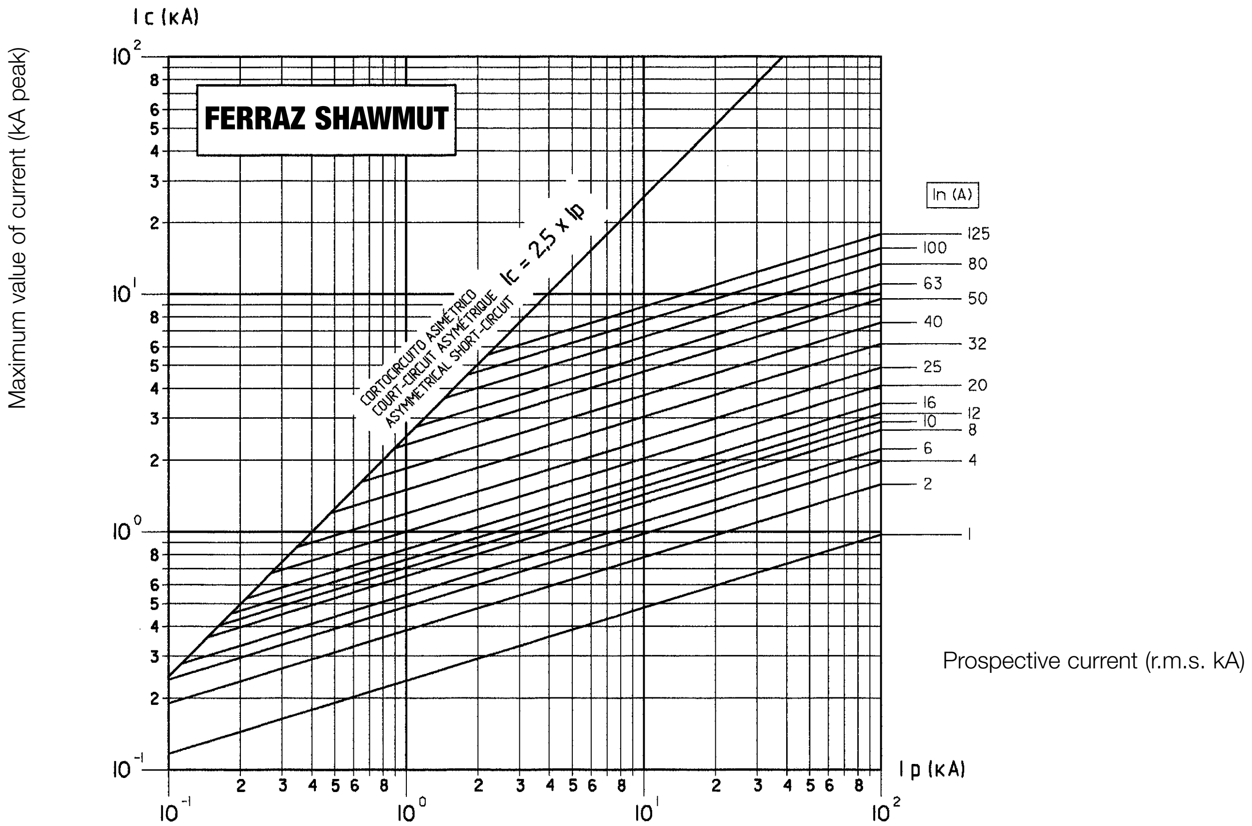
French Ferrule

aM

Characteristics t-I



Cut-off characteristics

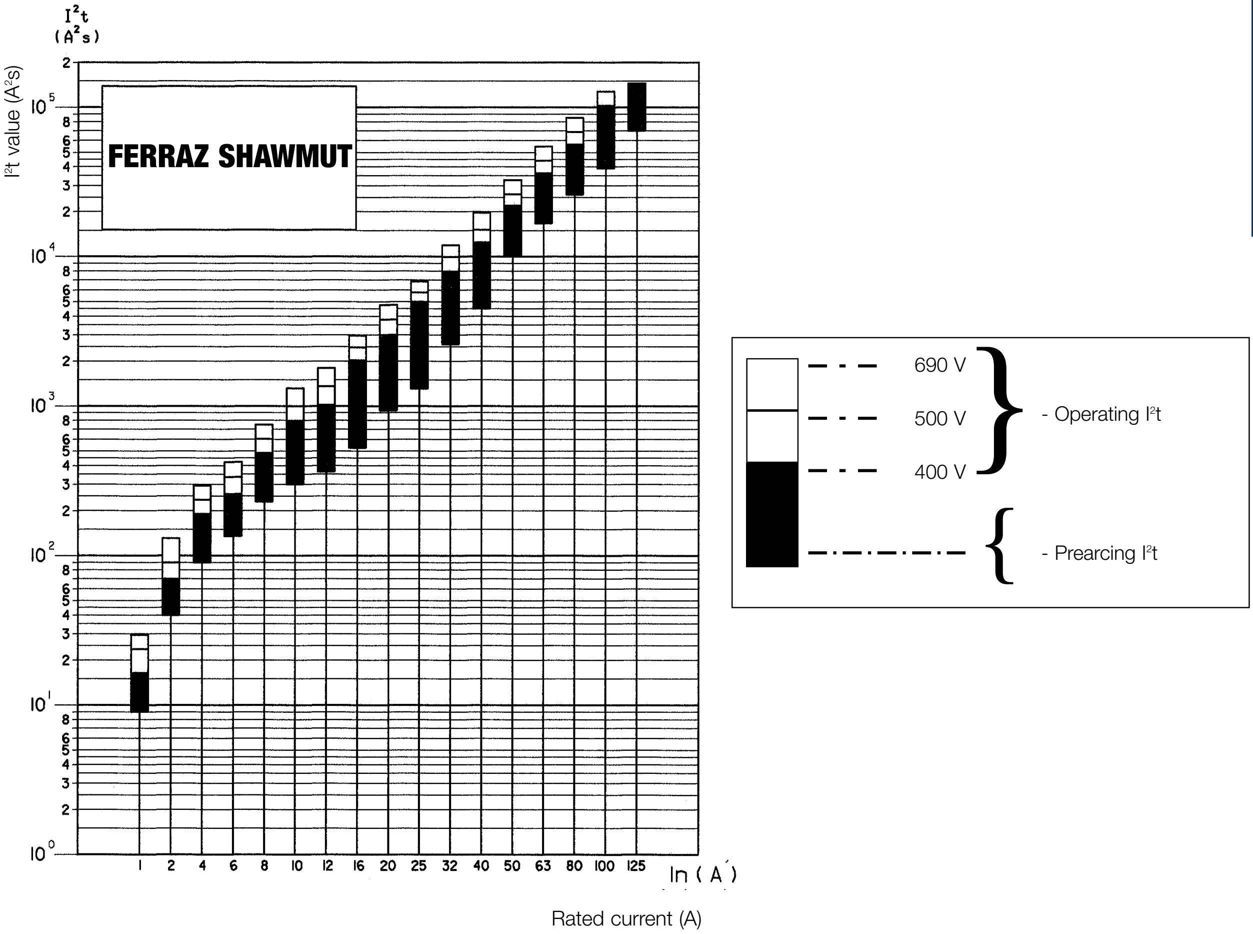


General Purpose Fuses

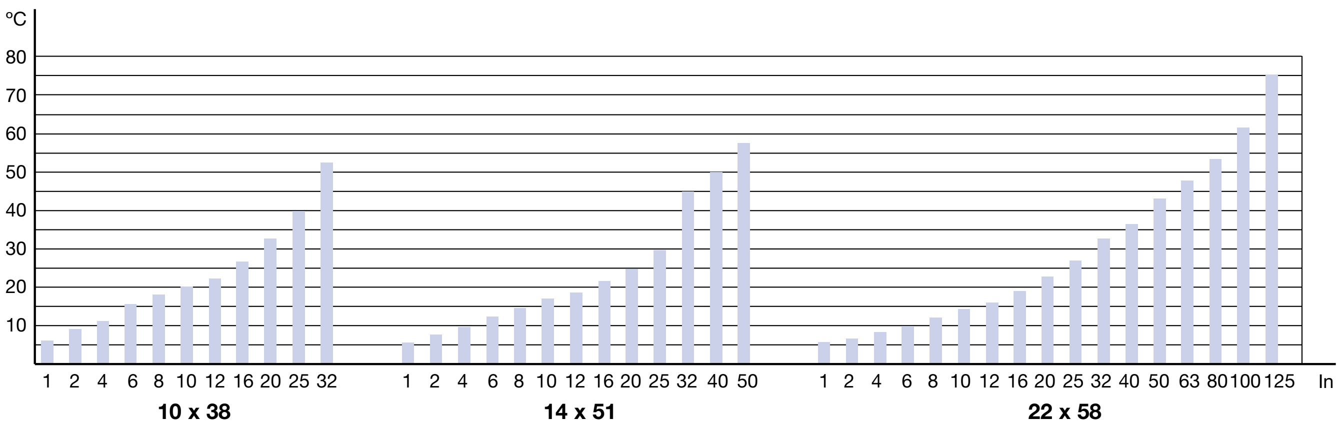
French Ferrule

aM

Characteristics I^2t



Temperature increase table (testing in superior contact)



General Purpose Fuses

French Ferrule

aM

Power loss table

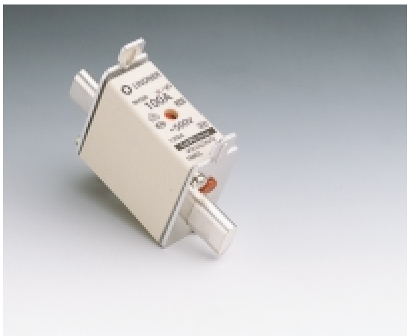
In	Size		
	10 x 38	14 x 51	22 x 58
0,16 A	0,35 W		
0,25 A	0,50 W	0,70 W	
0,5 A	0,50 W	0,75 W	
1 A	0,13 W	0,18 W	0,20 W
2 A	0,20 W	0,25 W	0,30 W
4 A	0,30 W	0,40 W	0,50 W
6 A	0,45 W	0,55 W	0,65 W
8 A	0,55 W	0,65 W	0,75 W
10 A	0,65 W	0,75 W	0,85 W
12 A	0,75 W	0,85 W	1 W
16 A	0,90 W	1,20 W	1,40 W
20 A	1,10 W	1,50 W	1,70 W
25 A	1,40 W	1,80 W	2 W
32 A	2 W	2,10 W	2,60 W
40 A		2,60 W	3,20 W
45 A		2,80 W	
50 A		2,90 W	3,90 W
63 A			4,60 W
80 A			5,60 W
100 A			6,50 W
125 A			9,50 W

IEC 269-2-1 NFC 63.213 UNE 21.103-2-1	10 x 38	14 x 51	22 x 58
	16 A	50 A	100 A
	1,2 W	3 W	7 W

Table of maximum longitudes of network in function of In and conductor section

aM CLASS FUSES

Copper conductor section (mm²)	RATED CURRENT (In) OF aM FUSES (in A)									
	16	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
1,5	55/64	37/45	25/30	15/20						
2,5	116	84/94	58/68	40/49	26/32	17/20				
4	181	147	118	84/95	58/68	42/48	28/33	18/23		
6	273	223	178	139	105/117	79/89	55/64	37/42	26/31	14/20
10				227	181	147	113/12	80/94	57/69	40/47
16						236	5	151	120	83/97
25							189	231	185	147
35									262	210



NH Fuse System

DIN 57 636/VDE 0636 Parts 1, 10, 21, 22, 201
IEC 60269-2
DIN 43 620 Parts 1 to 4 (Standard dimensions)

The utilization category is identified by two letters, the first indicating the **operational class** and the second the **object to be protected**. The Lindner range includes fuse-links to DIN VDE 0636 standard for the following utilization categories:

gL: general purpose cable and line protection
aM: backup switchgear and controlgear protection
gTr: general purpose transformer protection
gR: general purpose, fast acting
aR: partial purpose, fast acting

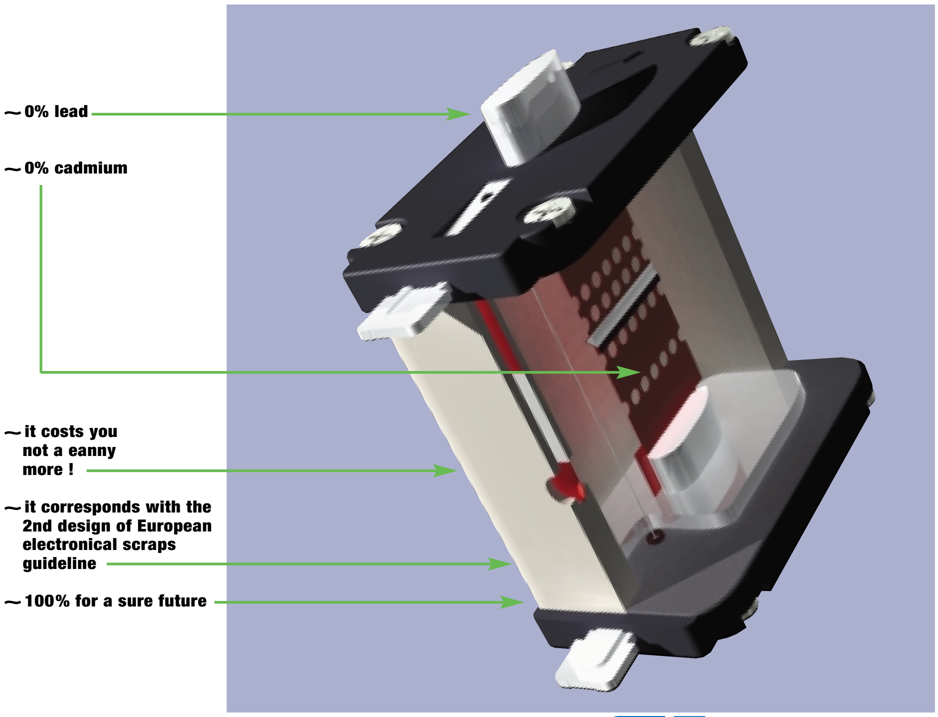
Classification

The NH system is classed among plug-in fuse systems and is comprised of:
- fuse-base, (possibly including terminal covers and phase barriers)
- fuse-link with blade contact
- fuse-link replacement device (LV HRC fuse puller)

Since the design of this system cannot guarantee non-interchangeability of rated current, it must be handled by a qualified professional.

Approval symbols

Germany
Austria
Switzerland
Netherlands



General Purpose Fuses

NH Fuses

500V gL-gG



NH-ZERO
Fuse-links
~500 V gL-gG
with voltage-conducting grip lug, combination recognition signal, contact blades, complying with DIN VDE 0636 part 201

Cd/Pb-free

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
000/C00	2	3,9	1B613.000000	B211946	9
	4	1,5	1B619.000000	M212462	9
	6	1,6	1B623.000000	D213995	9
	10	1,1	1B631.000000	B219651	9
	16	1,8	1B635.000000	K222097	9
	20	2,4	1B637.000000	A222847	9
	25	2,4	1B639.000000	E201185	9
	32	2,7	1B643.000000	Z211438	9
	35	3,0	1B645.000000	C211947	9
	40	3,4	1B647.000000	N212463	9
	50	3,9	1B651.000000	T212974	9
	63	4,7	1B655.000000	E213996	9
	80	5,7	1B659.000000	Y216543	9
	100	6,7	1B663.000000	B219122	9
00	125	8,4	1B765.000000	R201863	3
	160	10,6	1B769.000000	P211084	3
0	6	1,8	1B023.000000	H213148	3
	10	1,5	1B031.000000	G214159	3
	16	2,5	1B035.000000	Q215179	3
	20	3,5	1B037.000000	R215686	3
	25	3,5	1B039.000000	Y216198	3
	32	3,2	1B043.000000	W216702	3
	35	3,5	1B045.000000	J217220	3
	40	4,2	1B047.000000	P217731	3
	50	5,1	1B051.000000	Z218246	3
	63	6,2	1B055.000000	N218765	3
	80	7,1	1B059.000000	C219284	3
	100	8,7	1B063.000000	D219814	3
	125	11,0	1B065.000000	P222492	3
	160	11,7	1B069.000000	F223013	3
	200		08000.200700*	Q215524*	1
	224		08000.224700*	V219645*	1
	250		08000.250700*	F222093*	1
1	16	2,5	1B135.000000	M200801	3
	20	3,5	1B137.000000	C201344	3
	25	3,3	1B139.000000	N201860	3
	32	3,2	1B143.000000	L211081	3
	35	3,5	1B145.000000	A211600	3
	40	4,2	1B147.000000	Y212633	3
	50	5,1	1B151.000000	B213648	3
	63	6,2	1B155.000000	L214669	3
	80	7,1	1B159.000000	S215687	3
	100	8,7	1B163.000000	X216703	3
	125	11,0	1B165.000000	Q217732	3
	160	11,7	1B169.000000	A218247	3
	200	14,5	1B171.000000	P218766	3
	224	15,9	1B173.000000	D219285	3
	250	19,7	1B175.000000	E219815	3
2	35	3,5	1B245.000000	P201861	3
	50	5,1	1B251.000000	B211601	3
	63	6,0	1B255.000000	Z212634	3
	80	7,1	1B259.000000	C213649	3
	100	8,6	1B263.000000	M214670	3
	125	10,6	1B265.000000	T215688	3
	160	11,9	1B269.000000	Y216704	3
	200	14,0	1B271.000000	R217733	3
	224	15,4	1B273.000000	Q218767	3
	250	19,1	1B275.000000	R222494	3
	300	22,5	1B277.000000	P200803	3
	315	24,0	1B279.000000	E201346	3
	350	26,2	1B281.000000	Q201862	3
	400	30,2	1B283.000000	N211083	3

* Previous design with frontal indicator
Characteristic curves, see page 97
Dimensions, see page 101

General Purpose Fuses

NH Fuses

500V gL-gG



NH-ZERO
Fuse-links
~500 V gL-gG
with voltage-conducting grip lug, combination recognition signal, contact blades, complying with DIN VDE 0636 part 201

Cd/Pb-free

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
3	250	17,9	1B375.000000	C211602	1
	300		1B377.000000	A212635	1
	315	22,4	1B379.000000	L213151	1
	355	23,5	1B381.000000	K214162	1
	400	30,1	1B383.000000	T215182	1
	425	33,0	1B385.000000	B216201	1
	450		1B386.000000	Z216705	1
	500	44,0	1B387.000000	M217223	1
	630	47,5	1B389.000000	S217734	1
4* (With screw contact)	400	31,0	08004.400700	A216039	1
	500	35,0	08004.500700	X216542	1
	630	44,0	08004.630700	W217576	1
	800	70,0	08004.800700	E218090	1
	1000	85,0	08004.100700	H201694	1
	1250	93,0	08004.125700	C213994	1
4a* (Contact blades for NH-bottom SIZE 4A with transient device)	500	35,0	08014.500700	D201184	1
	630	44,0	08014.630700	T205752	1
	800	70,0	08014.800700	Y211437	1
	1000	85,0	08014.100700	A219650	1
	1250	93,0	08014.125700	J200637	1

* With frontal indicator
Corrosion-resistant design with V2A-screws: on request
Characteristic curves, see page 97
Dimensions, see page 101

Ferraz Shawmut

General Purpose Fuses

NH Fuses

500V gL-gG



NH-ZERO
Fuse links
~500 V gL-gG
with voltage-free
metal grip lugs (SGL version),
combination recognition signal,
contact blades,
complying with DIN VDE 0636 part 201

Cd/Pb-free

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
000/C00	2	3,9	1F613.000000	C219652	9
	4	1,5	1F619.000000	N205770	9
	6	1,6	1F623.000000	P212464	9
	10	1,1	1F631.000000	V215528	9
	16	1,8	1F635.000000	F213997	9
	20	2,4	1F637.000000	F218091	9
	25	2,4	1F639.000000	K200638	9
	32	2,7	1F643.000000	D213489	9
	35	3,0	1F645.000000	G201187	9
	40	3,4	1F647.000000	D219653	9
	50	3,9	1F651.000000	C222849	9
	63	4,7	1F655.000000	R212466	9
	80	5,7	1F659.000000	N215016	9
	100	6,7	1F663.000000	J201189	9
00	125	8,4	1F765.000000	V200808	3
	160	10,6	1F769.000000	W201867	3
0	6	1,8	1F023.000000	B212636	3
	10	1,5	1F031.000000	M213152	3
	16	2,5	1F035.000000	E213651	3
	20	3,5	1F037.000000	L214163	3
	25	3,3	1F039.000000	P214672	3
	32	3,2	1F043.000000	V215183	3
	35	3,5	1F045.000000	W215690	3
	40	4,2	1F047.000000	C216202	3
	50	5,1	1F051.000000	A216706	3
	63	6,2	1F055.000000	N217224	3
	80	7,1	1F059.000000	T217735	3
	100	8,7	1F063.000000	D218250	3
	125	11,0	1F065.000000	S218769	3
	160	11,7	1F069.000000	F219287	3
1	16	2,5	1F135.000000	H219818	3
	20	3,5	1F137.000000	T222496	3
	25	3,3	1F139.000000	K223017	3
	32	3,2	1F143.000000	R200805	3
	35	3,5	1F145.000000	G201348	3
	40	4,2	1F147.000000	Q211085	3
	50	5,11	1F151.000000	L212116	3
	63	6,2	1F155.000000	N213153	3
	80	7,1	1F159.000000	M214164	3
	100	8,7	1F163.000000	W215184	3
	125	11,0	1F165.000000	D216203	3
	160	11,7	1F169.000000	B216707	3
	200	14,5	1F171.000000	P217225	3
	224	15,9	1F173.000000	V217736	3
	250	19,7	1F175.000000	E218251	3
2	35	3,5	1F245.000000	L223018	3
	50	5,1	1F251.000000	H201349	3
	63	6,0	1F255.000000	T201865	3
	80	7,1	1F259.000000	F211605	3
	100	8,6	1F263.000000	P213154	3
	125	10,6	1F265.000000	N214165	3
	160	11,9	1F269.000000	X215185	3
	200	14,0	1F271.000000	E216204	3
	224	15,4	1F273.000000	Q217226	3
	250	19,1	1F275.000000	F218252	3
	300	22,5	1F277.000000	H219289	3
	315	24,0	1F279.000000	K219820	3
	355	26,2	1F281.000000	M223019	3
	400	30,2	1F283.000000	T200807	3
3	250	17,9	1F375.000000	J201350	1
	300		1F377.000000	S211087	1
	315	22,4	1F379.000000	G211606	1
	355	23,5	1F381.000000	E212639	1
	400	30,1	1F383.000000	H213654	1
	425	33,0	1F385.000000	S214675	1
	450		1F386.000000	Z215693	1
	500	44,0	1F387.000000	F216205	1
	630	47,5	1F389.000000	D216709	1

Corrosion-resistant design with V2A screws: on request

Characteristic curves page 97
Dimensions page 101

General Purpose Fuses

NH Fuses

400V gL-gG



NH-ZERO
Fuse links
~400 V gL-gG
with voltage-conducting grip lug, combination recognition signal, contact blades, complying with DIN VDE 0636 part 201
Available from mid-2000

Cd/Pb-free

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER		PACK.
000/00C	2	3,9	1A613.000000	Z223674	120	9
	4	1,5	1A619.000000	A223675	120	9
	6	1,6	1A623.000000	B223676	120	9
	10	1,1	1A631.000000	C223677	120	9
	16	1,5	1A635.000000	D223678	120	9
	20	1,7	1A637.000000	E223679	120	9
	25	1,9	1A639.000000	F223680	120	9
	32	2,5	1A643.000000	G223681	120	9
	35	2,7	1A645.000000	H223682	120	9
	40	3,2	1A647.000000	J223683	120	9
	50	3,3	1A651.000000	K223684	120	9
	63	3,8	1A655.000000	L223685	120	9
	80	4,5	1A659.000000	M223686	120	9
	100	5,5	1A663.000000	N223687	120	9
00	125	8,4	1A765.000000	E223702	180	3
	160	10,0	1A769.000000	F223703	180	3
1	35	3,5	1A145.000000	J223706	280	3
	50	4,7	1A151.000000	K223707	280	3
	63	5,0	1A155.000000	L223708	280	3
	80	5,4	1A159.000000	M223709	280	3
	100	7,0	1A163.000000	N223710	280	3
	125	8,8	1A165.000000	P223711	300	3
	160	11,0	1A169.000000	Q223712	300	3
	200	13,5	1A171.000000	R223713	300	3
	224	15,0	1A173.000000	S223714	300	3
	250	17,0	1A175.000000	T223715	300	3
2	80	5,4	1A259.000000	F223726	320	3
	100	7,0	1A263.000000	G223727	320	3
	125	8,8	1A265.000000	H223728	320	3
	160	11,0	1A269.000000	J223729	320	3
	200	13,5	1A271.000000	K223730	320	3
	224	15,0	1A273.000000	L223731	320	3
	250	17,0	1A275.000000	M223732	320	3
	315	19,5	1A279.000000	N223733	400	3
	355	23,0	1A281.000000	P223734	400	3
	400	25,0	1A283.000000	Q223735	400	3
3	250	17,0	1A375.000000	R223736	450	1
	315	19,5	1A379.000000	S223737	450	1
	400	25,0	1A383.000000	T223738	450	1
	500	30,0	1A387.000000	V223739	600	1
	630	40,0	1A389.000000	W223740	600	1

Corrosion-resistant design with V2A screws : on request

Characteristic curves see page 97
Dimensions see page 101

General Purpose Fuses

NH Fuses

400V gL-gG



NH-ZERO
Fuse-links
~400 V gL-gG
with voltage-free metal grip lugs (SGL version), combination recognition signal, contact blades, complying with DIN VDE 0636 part 201
Available from mid-2000

Cd/Pb-free

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER		PACK.
	2	3,9	1E613.000000	P223688	120	9
	4	1,5	1E619.000000	Q223689	120	9
	6	1,6	1E623.000000	R223690	120	9
	10	1,1	1E631.000000	S223691	120	9
	16	1,5	1E635.000000	T223692	120	9
	20	1,7	1E637.000000	V223693	120	9
	25	1,9	1E639.000000	W223694	120	9
	32	2,5	1E643.000000	X223695	120	9
	35	2,7	1E645.000000	Y223696	120	9
	40	3,2	1E647.000000	Z223697	120	9
	50	3,3	1E651.000000	A223698	120	9
	63	3,8	1E655.000000	B223699	120	9
	80	4,5	1E659.000000	C223700	120	9
	100	5,5	1E663.000000	D223701	120	9
00	125	8,4	1E765.000000	G223704	180	3
	160	10,0	1E769.000000	H223705	180	3
1	35	3,5	1E145.000000	V223716	280	3
	50	4,7	1E151.000000	W223717	280	3
	63	5,0	1E155.000000	X223718	280	3
	80	5,4	1E159.000000	Y223719	280	3
	100	7,0	1E163.000000	Z223720	280	3
	125	8,8	1E165.000000	A223721	300	3
	160	11,0	1E169.000000	B223722	300	3
	200	13,5	1E171.000000	C223723	300	3
	224	15,0	1E173.000000	D223724	300	3
	250	17,0	1E175.000000	E223725	300	3
2	80	5,4	1E259.000000	X223741	320	3
	100	7,0	1E263.000000	Y223742	320	3
	125	8,8	1E265.000000	Z223743	320	3
	160	11,0	1E269.000000	A223744	320	3
	200	13,5	1E271.000000	B223745	320	3
	224	15,0	1E273.000000	C223746	320	3
	250	17,0	1E275.000000	D223747	320	3
	315	19,5	1E279.000000	E223748	400	3
	355	23,0	1E281.000000	F223749	400	3
	400	25,0	1E283.000000	G223750	400	3
3	250	17,0	1E375.000000	H223751	450	1
	315	19,5	1E379.000000	J223752	450	1
	400	25,0	1E383.000000	K223753	450	1
	500	30,0	1E387.000000	L223754	600	1
	630	40,0	1E389.000000	M223755	600	1

Corrosion-resistant design with V2A screws: on request

Characteristic curves page 97
Dimensions see 102

NH Fuses

690V gL-gG



NH Fuse-links
~690 V gL-gG
with voltage-conducting grip lug,
contact blades,
complying with DIN VDE 0636
part 21,
DIN 43620 part 1

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
000/00C	2	1,4	07999.002765	Q201701	3
	4	1,1	07999.004765	C205921	3
	6	1,3	07999.006765	A213049	3
	10	1,6	07999.010765	V213550	3
	16	1,8	07999.016765	T214055	3
	20	2,3	07999.020765	C214569	3
	25	2,6	07999.025765	J215081	3
	32	3,2	07999.032765	G211445	3
	35	3,6	07999.035765	J215587	3
00	40	4,0	07999.040765	Y212472	3
	50	4,9	07999.050765	Q216099	3
	63	5,6	07999.063765	N216603	3
	80	6,2	07999.080765	Z217119	3
	100	7,0	07999.100765	F217631	3
0	6	1,1	08000.006765	K213495	1
	10	1,3	08000.010765	P214511	1
	16	1,9	08000.016765	B215534	1
	20	2,4	08000.020765	F216044	1
	25	2,7	08000.025765	G216551	1
	32	4,0	08000.032765	S217067	1
	35	4,3	08000.035765	D217583	1
	40	4,9	08000.040765	K218095	1
	50	5,6	08000.050765	N218604	1
	63	6,3	08000.063765	G219127	1
	80	7,2	08000.080765	L219660	1
	100	8,5	08000.100765	R222103	1
	125	10,8	08000.125765	J222855	1
	160	14	08000.160765	P200642	1
1	16	1,9	08001.016765	M201192	1
	20	2,4	08001.020765	R201702	1
	25	2,7	08001.025765	D205922	1
	32	4,0	08001.032765	Z212473	1
	35	4,3	08001.035765	E212984	1
	40	4,9	08001.040765	V215022	1
	50	5,6	08001.050765	C215535	1
	63	6,3	08001.063765	H216552	1
	80	7,2	08001.080765	L218096	1
	100	8,5	08001.100765	H219128	1
	125	10,8	08001.125765	S222104	1
	160	14	08001.160765	Q200643	1
	200	16	08001.200765	H211446	1

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
2	32	4,0	08002.032765	L213496	1
	35	4,3	08002.035765	Q214512	1
	40	4,9	08002.040765	W215023	1
	50	5,6	08002.050765	D215536	1
	63	6,3	08002.063765	H216046	1
	80	7,5	08002.080765	J216553	1
	100	8,8	08002.100765	T217068	1
	125	11,5	08002.125765	M218097	1
	160	14	08002.160765	Q218606	1
	200	17	08002.200765	N219662	1
	224	19	08002.224765	M211956	1
	250	21	08002.250765	B212475	1
	300	23	08002.300765	R214513	1
	315	25,2	08002.315765	X215024	1
3	250	17	08003.250765	V217069	1
	300	21	08003.300765	G217586	1
	315	23	08003.315765	R218607	1
	355	25,2	08003.355765	L222857	1
	400	32,6	08003.400765	R200644	1
	425	36	08003.425765	T201704	1
	500	43	08003.500765	G212986	1
4	400	33	08004.400765	N214004	1
	500	33	08004.500765	Y215025	1
	630	58	08004.630765	E215537	1
	800	71	08004.800765	K216554	1
4a	400	33	08014.400765	W217070	1
	500	43	08014.500765	H217587	1
	630	58	08014.630765	W222107	1
	800	71	08014.800765	M222858	1

With screw contact

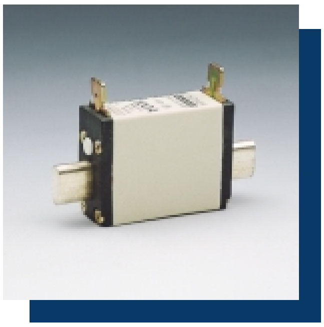
Contact blade
for NH-bottom SIZE 4a
with transient device

Characteristic curves page 97
Dimensions page 102

General Purpose Fuses

NH Fuses

690V gL-gG



NH Fuse-links
~690 V gL-gG
with voltage-free metal grip lugs, frontal combination recognition signal,
contact blades,
complying with DIN VDE 0636 part 21,
DIN 43620 part 1

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
000/00C	2	1,4	17999.002765	M218143	3
	4	1,1	17999.004765	A218661	3
	6	1,3	17999.006765	P219180	3
	10	1,6	17999.010765	S219712	3
	16	1,8	17999.016765	Z222156	3
	20	2,3	17999.020765	T222910	3
	25	2,6	17999.025765	C200700	3
	32	3,2	17999.032765	P214005	3
	35	3,6	17999.035765	R201242	3
00	40	4,0	17999.040765	Z215026	3
	50	4,9	17999.050765	D201759	3
	63	5,6	17999.063765	E206981	3
	80	6,2	17999.080765	S211501	3
	100	7,0	17999.100765	Z212013	3
	125	8,2	17999.125765	J217588	3
1	35	4,3	18001.035765	P219663	1
	40	4,9	18001.040765	N222859	1
	50	5,6	18001.050765	S200645	1
	63	6,3	18001.063765	V201705	1
	80	7,2	18001.080765	K211448	1
	100	8,5	18001.100765	D212477	1
	125	10,8	18001.125765	P213499	1
	160	14	18001.160765	T214515	1
	200	16	18001.200765	G215539	1
2	32	4,0	18002.032765	M216556	1
	35	4,3	18002.035765	K217589	1
	40	4,9	18002.040765	S218608	1
	50	5,6	18002.050765	Q219664	1
	63	6,3	18002.063765	T200646	1
	80	7,5	18002.080765	H205949	1
	100	8,8	18002.100765	Q211959	1
	125	11,5	18002.125765	R214007	1
	160	14	18002.160765	B215028	1
	200	17	18002.200765	M216050	1
	224	19	18002.224765	Z222110	1
	250	21	18002.250765	Q201195	1
	300	23	18002.300765	R211960	1
	315	25,2	18002.315765	F212479	1

Characteristic curves page 97
Dimensions page 102

NH Fuse-links ~500V aM for protection of switchgear

NH fuse-links in operating class aM are current-limiting fuse-links for short circuit protection (back-up) of switchgear. The minimum melting time for these fuse-links is safely more than 1 minute at 4 x I_n. In the range up to 4 x I_n, no ageing occurs when the overload capacity characteristic is adhered to. Thermally-retarded switching devices, to which the fuse links have been classified, function in this current-time range without having to take the fuse into consideration.

At 4 x I_n and above, the time-current characteristic of the aM fuse links has a very steep curve (i.e. the fuse links are very fast acting). It can be assigned to the switchgear in such way that the fuse link safely breaks when the switching capacity has been exceeded.

NH fuse links with operating class aM have a rated voltage of ~ 500 V and are available for delivery in the following sizes and with the following rated currents:

00	2...	160 A rated current
0	6...	160 A rated current
1	16...	250 A rated current
2	32...	400 A rated current
3	315...	630 A rated current
4 a	630...	1250 A rated current

The breaking capacity of these fuse-links is 120 kA.

General Purpose Fuses

NH Fuses

500V aM



NH Fuse-links
~500 V aM
with voltage-conducting
grip lug,
contact blades,
complying with
DIN VDE 0636 part 22,
DIN 43620 part 1

SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
000/C00	2		07999.002505	T218609	3
	4		07999.004505	M219132	3
	6		07999.006505	R219665	3
	10		07999.010505	A222111	3
	16		07999.016505	W213551	3
	20		07999.020505	D214570	3
	25		07999.025505	K215588	3
	32		07999.032505	P216604	3
	35		07999.035505	G217632	3
	40		07999.040505	N218144	3
	50		07999.050505	Q219181	3
	63		07999.063505	A222157	3
	80		07999.080505	D200701	3
00	100		07999.100505	Q222861	3
	125		07999.125505	Y201708	3
	160		07999.160505	M211450	3
0	6		08000.006505	L212990	1
	10		08000.010505	Q213500	1
	16		08000.016505	C215029	1
	20		08000.020505	Q216559	1
	25		08000.025505	M217591	1
	32		08000.032505	V218610	1
	35		08000.035505	S219666	1
	40		08000.040505	B222112	1
	50		08000.050505	W200648	1
	63		08000.063505	Z201709	1
	80		08000.080505	N211451	1
	100		08000.100505	M212991	1
	125		08000.125505	S214008	1
	160		08000.160505	J215541	1
1	16		08001.016505	R216560	1
	20		08001.020505	B217075	1
	25		08001.025505	N217592	1
	32		08001.032505	R218101	1
	35		08001.035505	W218611	1
	40		08001.040505	P219134	1
	50		08001.050505	C222113	1
	63		08001.063505	X200649	1
	80		08001.080505	A201710	1
	100		08001.100505	B205966	1
	125		08001.125505	S211961	1
	160		08001.160505	S213502	1
	200		08001.200505	X214518	1
	224		08001.224505	T201198	1
	250		08001.250505	H205972	1
2	32		08002.032505	T211962	1
	35		08002.035505	K212483	1
	40		08002.040505	N212992	1
	50		08002.050505	T213503	1
	63		08002.063505	V214010	1
	80		08002.080505	Y214519	1
	100		08002.100505	K215542	1
	125		08002.125505	X218612	1
	160		08002.160505	R211454	1
	200		08002.200505	L212484	1
	224		08002.224505	D215030	1
	250		08002.250505	R219136	1
	315		08002.315505	T222864	1
	355		08002.355505	V201199	1
	400		08002.400505	S211455	1
3	315		08003.315505	M212485	1
	355		08003.355505	V213504	1
	400		08003.400505	A214521	1
	425		08003.425505	Q217594	1
	500		08003.500505	S218102	1
	630		08003.630505	C217076	1
4	630		08004.630505	E222115	1
	800		08004.800505	V222865	1
	1000		08004.100505	S219137	1
	1250		08004.125505	V219668	1

Characteristic curves page 98/99
Dimensions page 102

With screw contact

General Purpose Fuses

NH Fuses

690V aM



NH Fuse-links
~690 V aM
with voltage-conducting grip lug,
contact blades,
complying with
DIN VDE 0636 part 22,
DIN 43620 part 1

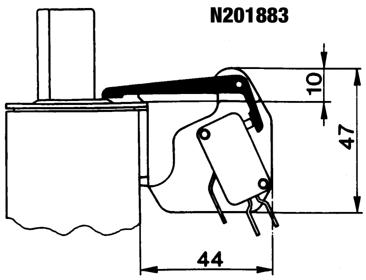
SIZE	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
00	6	180	32123	N214142	3
	10	180	32131	R214651	3
	16	180	32135	Y215163	3
	20	180	32137	A215671	3
	25	180	32139	E216181	3
	32	180	32143	E216687	3
	35	180	32145	R217204	3
	40	180	32147	W217714	3
	50	180	32151	F218229	3
	63	180	32155	T218747	3
	80	180	32159	K219797	3
	100	180	32163	W222475	3
	125	180	32165	N222997	3
	160	180	32169	T200784	3
1	50	300	32551	B215672	3
	63	300	32555	F216182	3
	80	300	32559	F216688	3
	100	300	32563	S217205	3
	125	300	32565	X217715	3
	160	300	32569	G218230	3
	200	300	32571	V218748	3
	250	300	32575	J219267	3
	315	300	32579	L219798	3
2	63	400	32655	V200785	3
	80	400	32659	M201330	3
	100	400	32663	W201844	3
	125	400	32665	S211064	3
	160	400	32669	L211587	3
	200	400	32671	S212099	3
	250	400	32675	H212619	3
	315	400	32679	V213136	3
	355	400	32681	M213635	3
	400	400	32683	Q214144	3
	500	400	32687	T214653	3
3	315	600	32779	A215165	3
	355	600	32781	C215673	3
	400	600	32783	G216183	3
	500	600	32787	G216689	3
	630	600	32789	T217206	3

Characteristic curves page 98/99
Dimensions page 102

Accessories



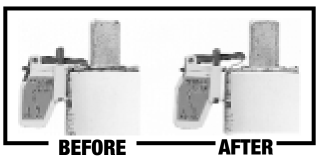
N201883



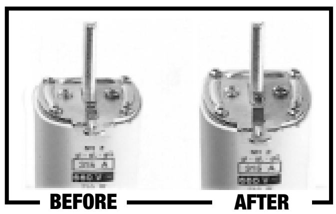
Microswitch – Sizes 00, 1, 2, 3 Only

00-1-2-3			45492	N201883		1

Microswitch Mounted



Blown-Fuse Indicator



General Purpose Fuses

NH Fuses

400V gTr

NH fuse-links for transformers



NH Fuse-links
~400 V
with voltage-conducting grip lug, combination recognition signal, contact blades, complying with DIN VDE 0636 part 22, DIN 43620 part 1

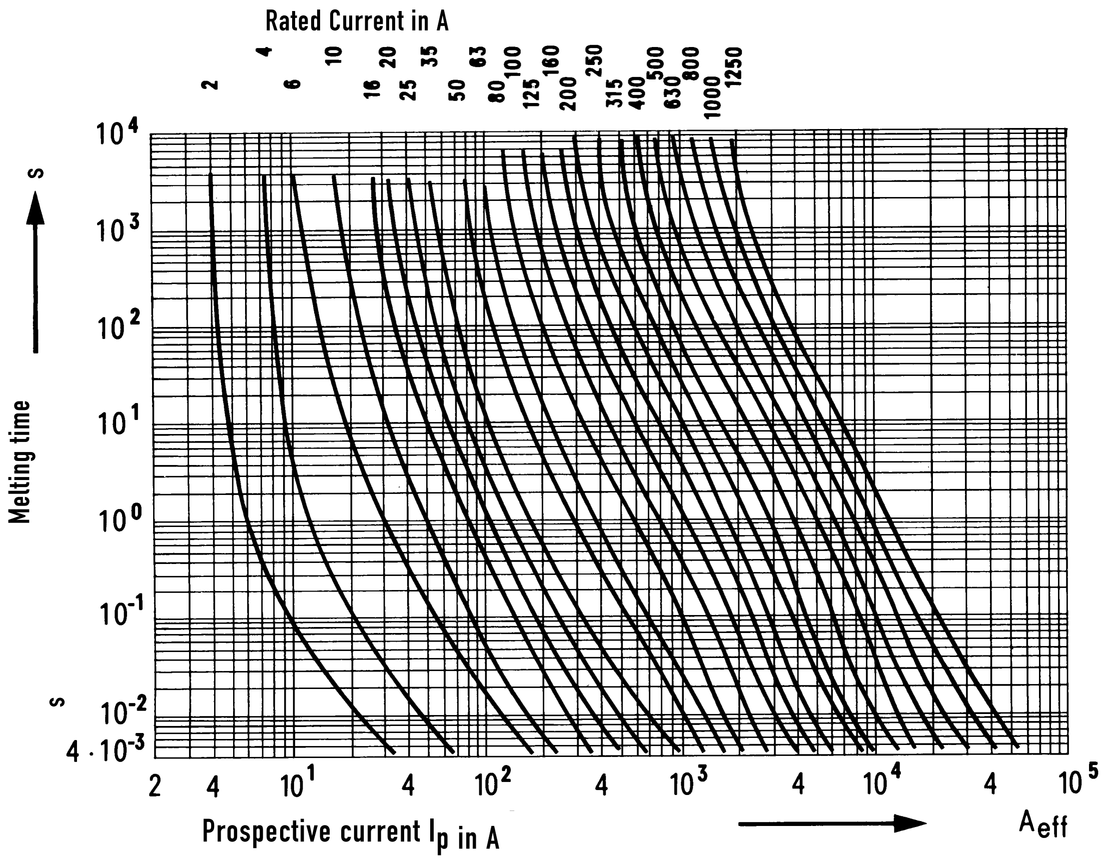
SIZE	Trans. Power in KVA (400V~)	RATED In CURRENT (A)	POWER LOSSES In (W)	CATALOG NUMBER	REFERENCE NUMBER	PACK.
2	100	145	12	08006.100005	W222866	1
	125	181	15	08006.125005	B211946	1
	160	231	18,4	08006.160005	W201200	1
	200	289	22	08006.200005	D201713	1
	250	361	27	08006.250005	D206175	1
3	250	361	26	08007.250005	V211457	1
	315	455	34	08007.315005	Z211967	1
	400	578	39	08007.400005	P212487	1
	500	723	49	08007.500005[1]	B233768A[1]	1
	630	910	69	08007.630005[1]	C223769A[1]	1
4a	100	145	11,4	08008.100005	T212997	1
	125	181	14,5	08008.125005	Y213507	1
	160	231	17,8	08008.160005	Z214014	1
	200	289	20,6	08008.200005	C214523	1
	250	361	25,7	08008.250005	F215032	1
	315	455	33,2	08008.315005	M215544	1
	400	578	38,1	08008.400005	S216055	1
	500	723	53,2	08008.500005	V216563	1
	630	910	68,7	08008.630005	E217078	1
	800	1155	90,4	08008.800005	R217595	1

Characteristic curves page 100
Dimensions page 102

Contact blade for NH-bottom SIZE 4a with transient device

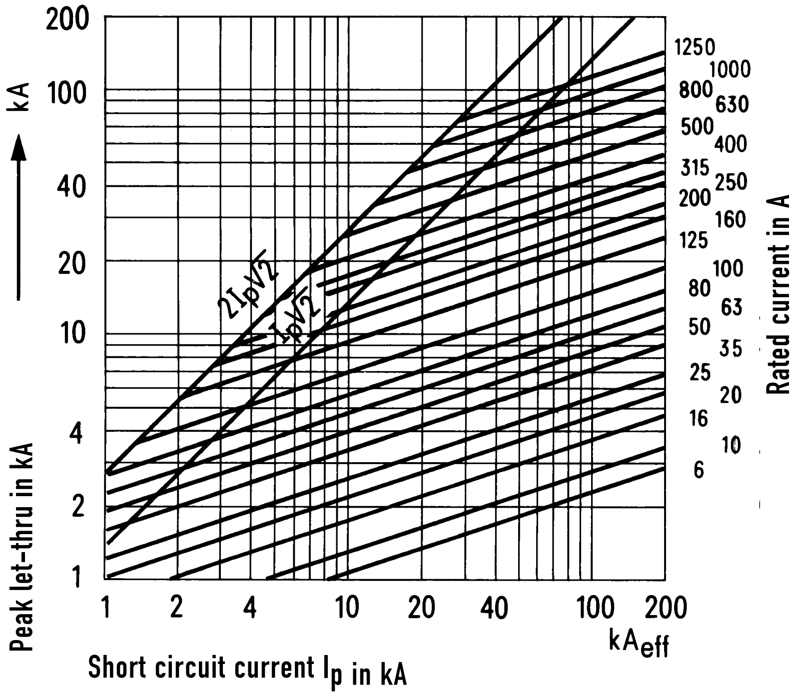
Melting time - current data

Size 000 with 4/4a, gl-gG, ~ 400 V, ~ 500 V, ~ 690 V



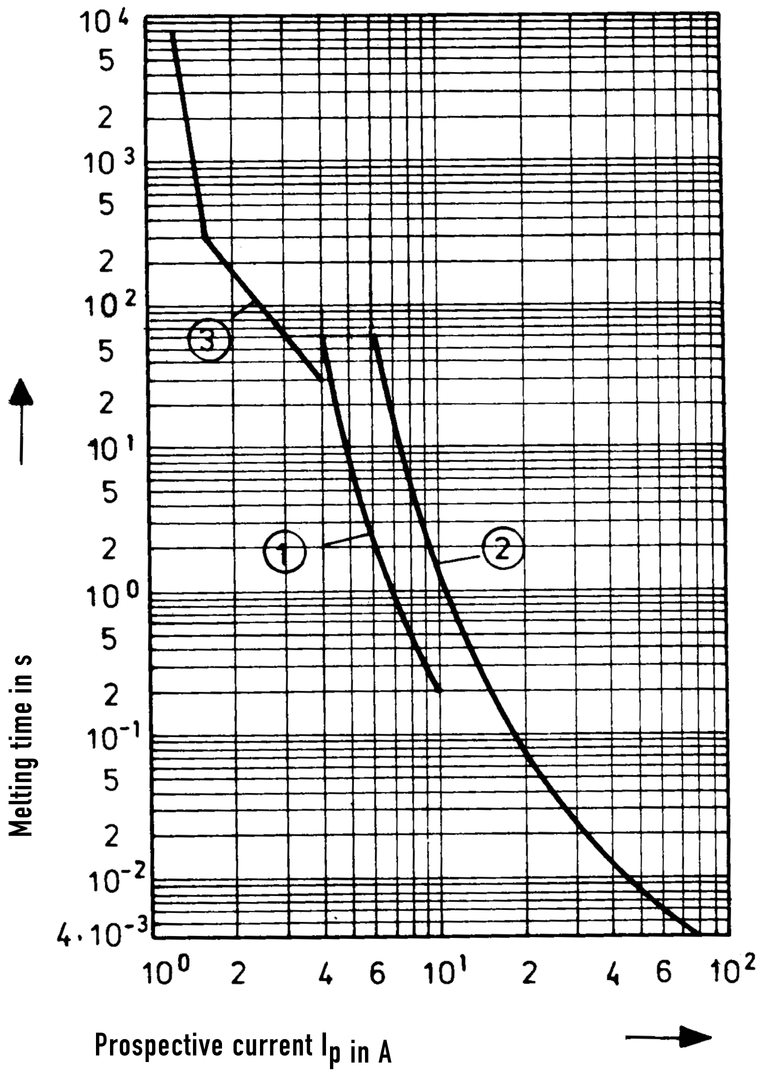
Peak let-thru current data

Size 000 with 4/4a, gL-gG, ~ 400 V, ~ 500 V, ~ 690 V



Melting time - current data

Class aM, ~ 500 V, ~ 690 V

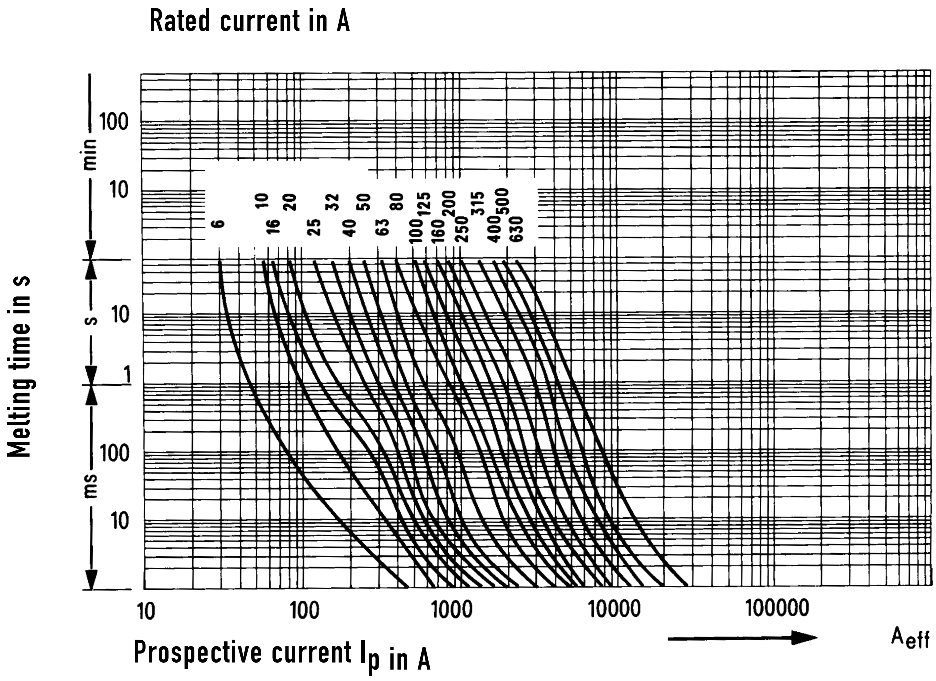


① under limit curve
② above limit curve
③ overload region

x I_N	4	6,3	8	10	12,5	25	50
t_{va} max s	–	60	–	–	0,5	0,04	0,009
t_{vs} min s	60	–	0,5	0,2	–	–	–

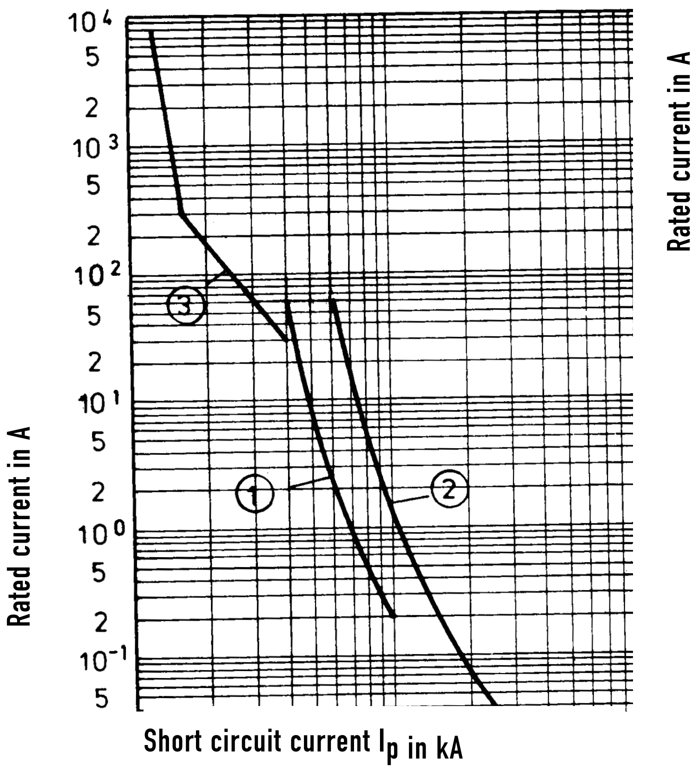
Melting time - current data

Class aM, ~ 500 V, ~ 690 V



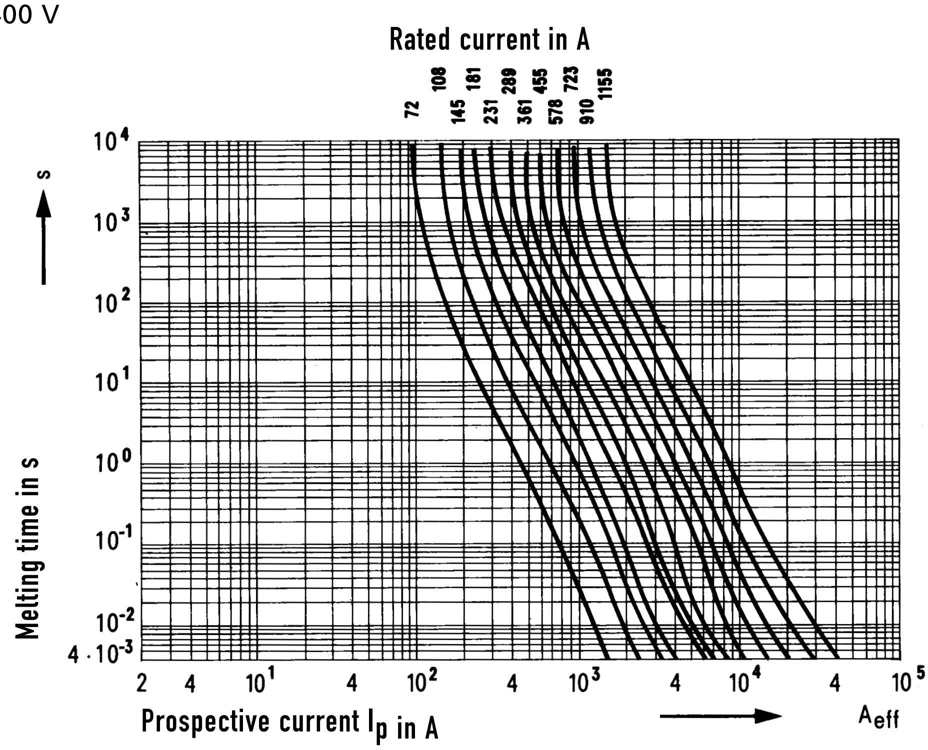
Peak let-thru current data

Class aM, ~ 500 V, ~ 690 V

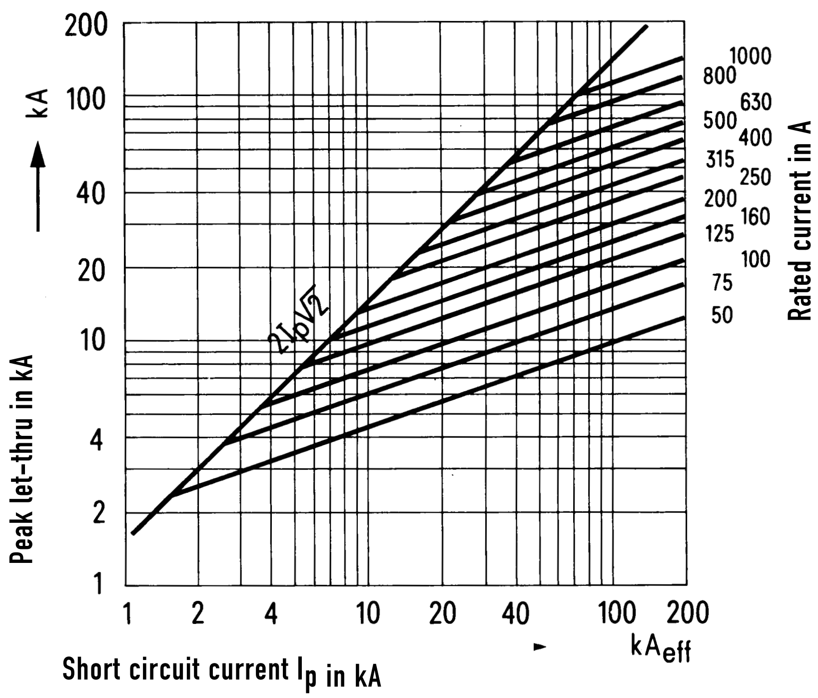


Melting - time current data

Class gTr, ~ 400 V



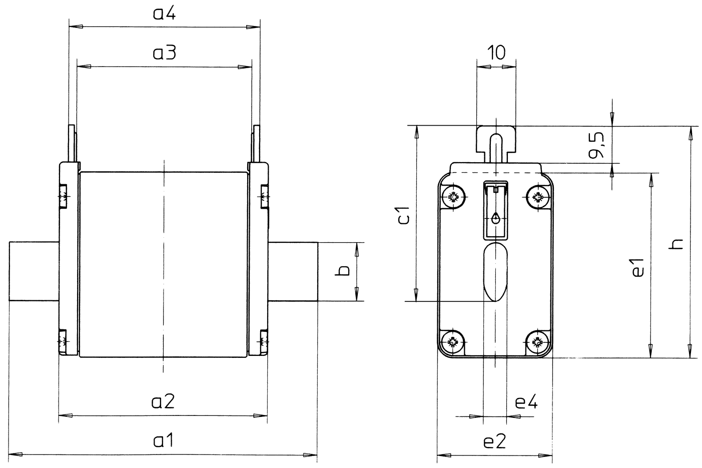
Class gTr, ~ 400 V



NH Fuses

500-690V gL-gG

NH Fuse-links



	RATED In CURRENT (A)	a1	a2	a3	a4	b	c1	e1	e2	e4	h
Standard 500 V and 400 V gL-gG with voltage-conducting grid lug (page 86/87, 89)											
SIZE 000	2-100A	79	52	45,5	49,5	15	35	40,5	20,8	6	52,5
SIZE 00	125/160A	79	52,8	45	50	15	35	47,5	29,5	6	59,5
SIZE 0	6-160A	125	66,8	61	66	15	35	47,5	29,5	6	59,5
SIZE 1	16-100A	135	70,8	63	68	15	40	47,5	29,5	6	64,5
SIZE 1	125-250A	135	70,8	63	68	20	40	52,5	39,5	6	64,5
SIZE 2	35-250A	150	72,3	63	68	20	48	52,5	39,5	6	72,5
SIZE 2	300-400A	150	72,3	63	68	26	48	60	51	6	72
SIZE 3	250-400A	150	72,3	63	68	26	60	60	51	6	83,5
SIZE 3	425-630A	150	72,3	63	68	33	60	74	70	6	86
SIZE 4	400-1250A	200	85	64	68	33	85	104	89	8	97
SIZE 4a	500-1250A	200	86	90	68	33	85	104	89	8	97
Standard 500 V and 400 V gL-gG (SGL version) with voltage-free grid lug (page 88, 90)											
SIZE 000	2-100A	78	53,4	45,7	49,7	15	35	40,5	20,8	6	52,5
SIZE 00	125/160A	79	53,5	44,8	49	15	35	47,5	29,5	6	59,5
SIZE 0	6-160A	125	67,5	62,5	66,7	15	35	47,5	29,5	6	59,5
SIZE 1	16-100A	135	71,5	62,8	67	15	40	47,5	29,5	6	64,5
SIZE 1	125-250A	135	73,4	63	67,2	20	40	52,5	39,5	6	64,5
SIZE 2	35-250A	150	73,4	63	67,2	20	48	52,5	39,5	6	72,5
SIZE 2	300-400A	150	73,4	63	67,2	26	48	60	51	6	72
SIZE 3	250-400A	150	73,4	63	68	26	60	60	51	6	83,5
SIZE 3	425-630A	150	73,4	63	68	33	60	74	70	6	86

General Purpose Fuses

NH Fuses

500-690V gL-gG

NH 690 V gL-gG with voltage-conducting grip lug (page 91)

Size	Rated current in A	a_1	a_2	a_3	a_4	b	c_1	e_1	e_2	e_4	h
SIZE 000	2-35A	79	53,8	45	49	15	35,8	40	20	6	47,8
SIZE 00	40-100A	79	53,8	45	49	15	35,8	48	30	6	47,8
SIZE 1	16-160A	135	75	64	68	20	40	44	30	6	52
SIZE 1	200A	135	75	64	68	20	40	47	39	6	52
SIZE 2	35-100A	150	75	64	68	26	48	44	30	6	60
SIZE 2	125-315A	150	75	64	68	26	60	47	39	6	72
SIZE 3	250/300A	150	75	64	68	26	60	47	39	6	72
SIZE 3	315-425A	150	75	64	68	33	60	58	51	6	72
SIZE 3	500A	150	75	64	68	33	60	70	64	6	72
SIZE 4	400-800A	200	85	64	68	33	85	104	89	8	97
SIZE 4a	400-800A	200	85	86	90	33	85	104	89	6	97

NH 690 V gL-gG with voltage-free grip lug (page 92)

Size	Rated current in A	a_1	a_2	a_3	a_4	b	c_1	e_1	e_2	e_4	h
SIZE 000	2-35A	79	53,8	45	49	15	35,8	40,5	21	6	47,8
SIZE 00	40-125A	79	53,8	45	49	15	35,8	40,5	30	6	47,8
SIZE 1	35-200A	135	75	64	68	20	40	51	39	6	52
SIZE 2	32-250A	150	75	64	68	26	48	51	39	6	60
SIZE 2	300/315A	150	75	64	68	26	48	60	46	6	60

NH 500 V aM with voltage-conducting grip lug (page 94)

Size	Rated current in A	a_1	a_2	a_3	a_4	b	c_1	e_1	e_2	e_4	h
SIZE 000	2-80A	79	53,8	45	49	15	35,8	40,5	21	6	47,8
SIZE 00	100-160A	79	53,8	45	49	15	35,8	40,5	30	6	47,8
SIZE 0	6-160A	125	68	64	68	15	35,8	44	30	6	47,8
SIZE 1	16-125A	135	75	64	68	20	40	44,5	30	6	52
SIZE 1	160-250A	135	75	64	68	20	40	47	39	6	52
SIZE 2	32-100A	150	75	64	68	26	48	44	30	6	60
SIZE 2	160/200A	150	75	64	68	26	48	47	39	6	60
SIZE 2	224/250A	150	75	64	68	26	60	56	44	6	72
SIZE 2	315-400A	150	75	64	68	26	48	47	39	6	60
SIZE 3	315-630A	150	75	64	68	33	60	58	51	6	72
SIZE 4	315-1250A	200	85	64	68	33	85	104	89	8	97

NH 690 V aM with voltage-conducting grip lug (page 95)

Size	Rated current in A	a_1	a_2	a_3	a_4	b	c_1	e_1	e_2	e_4	h
SIZE 00	6-160A	78	50	44	50	15	35	44	28	6	54
SIZE 1	50-315A	135	67	61	67	20	40	55	40	6	65
SIZE 2	63-500A	150	67	61	67	26	48	62,5	56	6	72,5
SIZE 3	315-630A	150	67	61	67	32	60	76	69	6	86

NH 400 V gTr with voltage-conducting grip lug (page 96)

Size	Rated current in A	a_1	a_2	a_3	a_4	b	c_1	e_1	e_2	e_4	h
SIZE 2	100-250kVA	150	75	64	68	26	48	47	39	6	60
SIZE 3	100-630kVA	150	75	64	68	33	60	58	51	6	72
SIZE 4a	100-800kVA	200	85	86	90	33	85	104	89	6	97

Dimensions in mm

General Purpose Fuses

NH Fuses

gG with striker



H216690



R223000



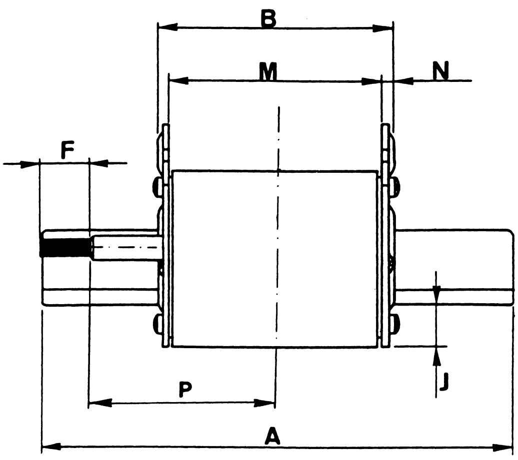
X214656

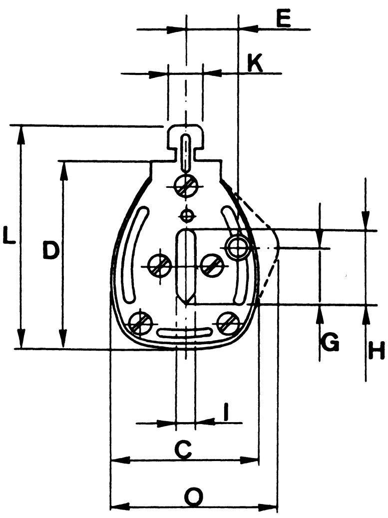


N219271

Ratings – gl-gL-gG with Striker

SIZE		RATED In CURRENT (A)	RATED VOLTAGE	CATALOG NUMBER	REFERENCE NUMBER	INTERRUPTING RATING (A)	STANDARD PACK
0	OS	32	690V	36443	P213637	80kA - 690V	3
		35		36445	S214146		
		40		36447	W214655		
		50		36451	B215166		
		63		36455	D215674		
		80		36459	J216185		
		100		36463	H216690		
		125	500V	36465	V217207	120kA - 500V	
		160		36469	A217718		
		200		36471	K218233		
1		80	690V	36559	Y218751	80kA - 690V	3
		100		36563	M219270		
		125		36565	P219801		
		160		36569	Z222478		
		200		36571	R223000		
		224	500V	36573	Y200788	120kA - 500V	
		250		36575	Q201333		
		315		36579	Z201847		
		355		36581	W211067		
2		125	690V	36665	W212102	80kA - 690V	3
		160		36669	L212622		
		200		36671	Y213139		
		224		36673	Q213638		
		250		36675	T214147		
		315		36679	X214656		
		355		36681	E215675		
		400	500V	36683	K216186	120kA - 500V	
		500		36687	W217208		
3		315	690V	36779	B217719	80kA - 690V	3
		355		36781	L218234		
		400		36783	Z218752		
		500		36787	N219271		
		630	500V	36789	Q219802	120kA - 500V	





Dimensions

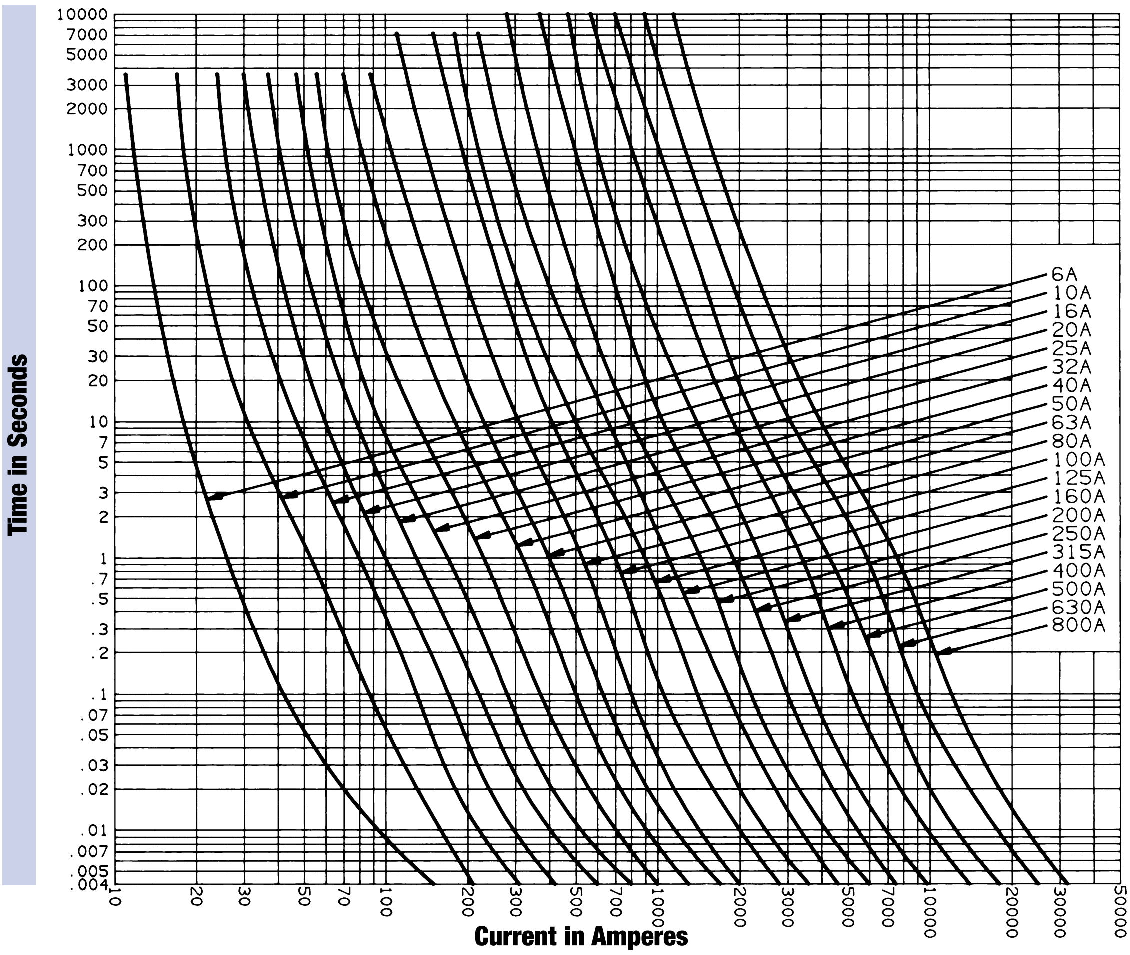
	0	1	2	3
A	124.5	134.5	150	150
B	66	67	67	67
C	39	40	56	69
D	49	55	62.5	76
E	14.5	16	19	24
F	15.5	15.5	15.5	15.5
G	14	14.5	14.5	14.5
H	15	20	26	32
I	6	6	6	6
J	14	14	15	16
K	10	10	10	10
L	59	65	72.5	86
M	60	61	61	61
N	3	3	3	3
O	41.5	45	-	-
P	47	52	60	60

General Purpose Fuses

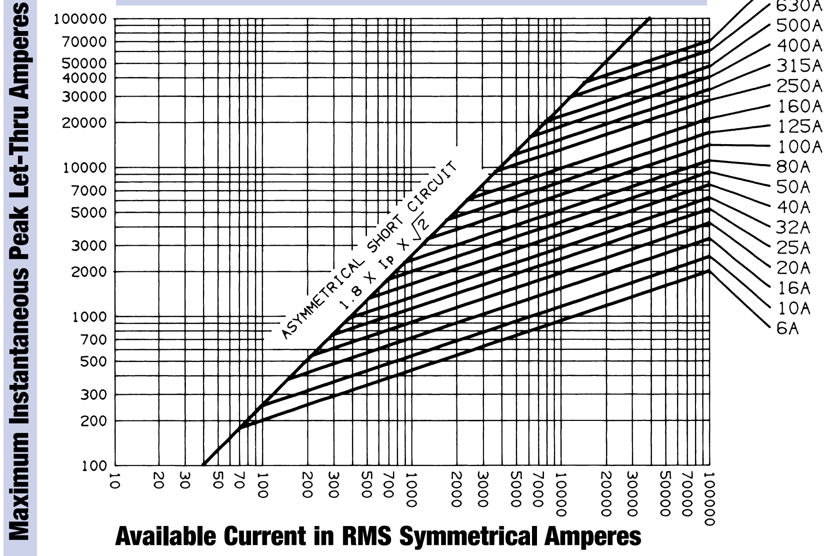
NH Fuses

gG with striker

Melting Time - Current Data – 6-800 Amperes



Peak Let-Thru Current Data – 6-800 Amperes



Striker



General Purpose Fuses

NH Fuses

gG with striker

Power Loss (Watts) at Rated Current

RATED In CURRENT (A)	SIZE						
	00	0	0S	1	2	3	4
6	1.3 W	1.7 W					
10	1.5 W	1.8 W					
16	1.9 W	2.2 W		2.2 W			
20	2.2 W	2.6 W		2.5 W			
25	2.6 W	3.1 W		3.0 W			
32	3.1 W	3.7 W		3.6 W	3.5 W		
35	3.3 W	4.0 W		3.9 W	3.8 W		
40	3.7 W	4.5 W		4.4 W	4.3 W		
50	4.4 W	5.2 W		4.9 W	4.8 W		
63	5.1 W	6.2 W		5.8 W	5.8 W		
80	6.1 W	7.5 W		6.9 W	6.8 W		
100	6.9 W	8.5 W		8.1 W	7.9 W		
125	9.1 W	10.7 W		9.6 W	9.5 W		
160	11.8 W	13.5 W	13.5 W	11.9 W	11.5 W		
200		15.0 W	15.0 W	14.9 W	14.5 W		
224		16.2 W	16.2 W	16.7 W	16.0 W		
250		17.8 W	17.8 W	18.7 W	17.5 W		
315				25.0 W	23.0 W	23 W	
355				28.0 W	25.0 W	25 W	
400					29.0 W	29 W	
425					34.0 W	34 W	
500					39.0 W	39 W	
630						47 W	
800						67 W	67 W
1000							78 W
1250							104 W

RATED In CURRENT (A)	00 100A	0 160A	1 250A	2 400A	3 630A	4 1000A
VDE 0660 (500V) IEC 269-2-1 (660V) UNE 21103 (500V) NFC 63210 (500V)	12.0	25 W	32 W	45 W	60 W	90 W
VDE 0636 (660V)	10.0 W	-	23 W	34 W	48 W	70 W
VDE 0636 (500V)	7.5 W	16 W	23 W	34 W	48 W	110 W
IEC 269 (500V)	7.5 W	16 W	23 W	34 W	48 W	90 W
UNESA (500V)	-	17 W	26 W	32 W	48 W	-
WDE W (500V)	7.5 W	16 W	21 W	32 W	42 W	-

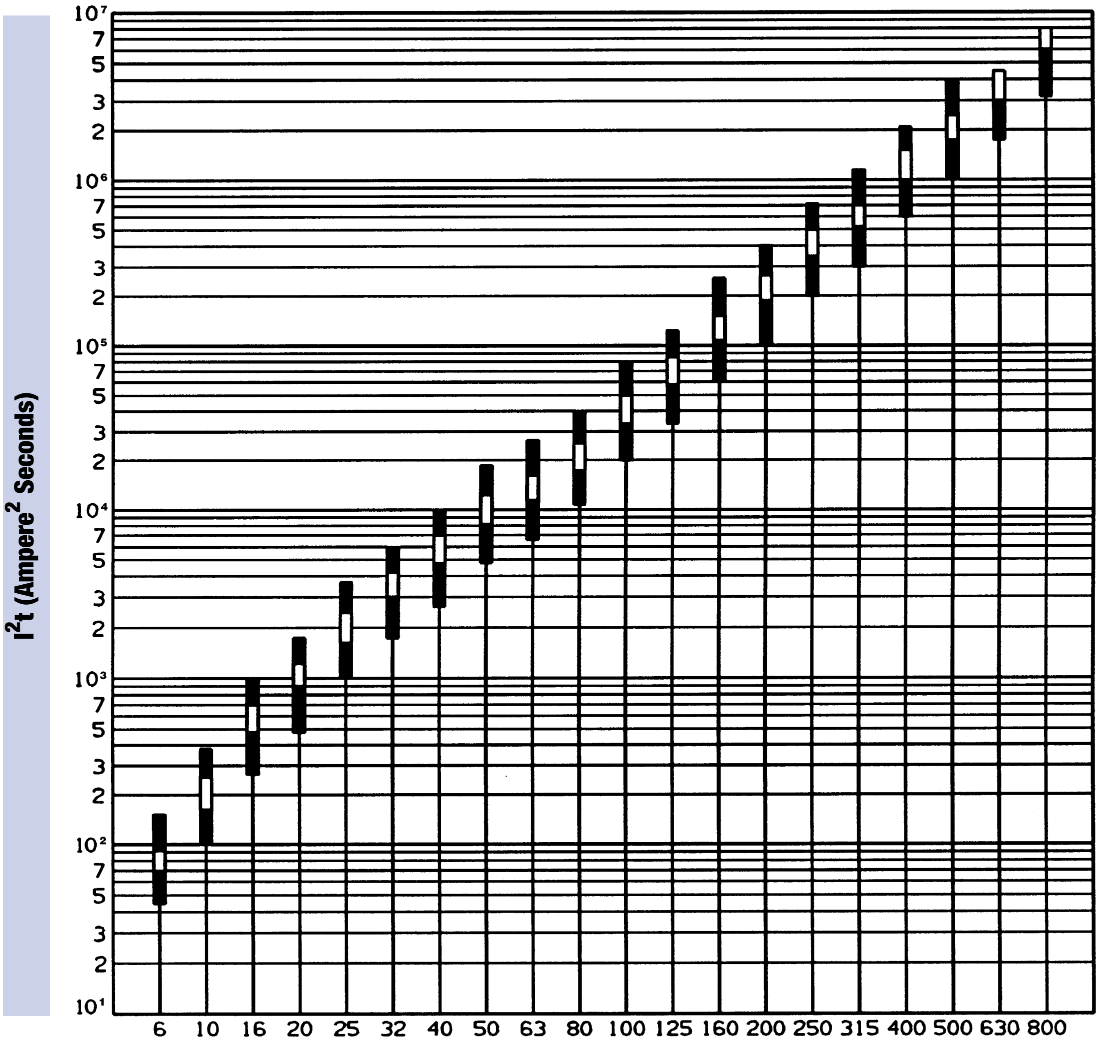
Typical values allowed by the standards.

General Purpose Fuses

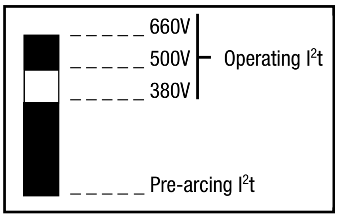
NH Fuses

gG with striker

I²t Characteristics – Discrimination



Fuse-link Rated Current In (A)



General Purpose Fuses

NH Fuses

aM with striker



L216187



Y212104



P219272



M216188

Striker



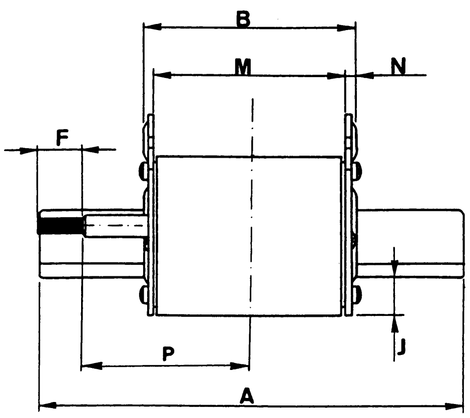
BEFORE AFTER

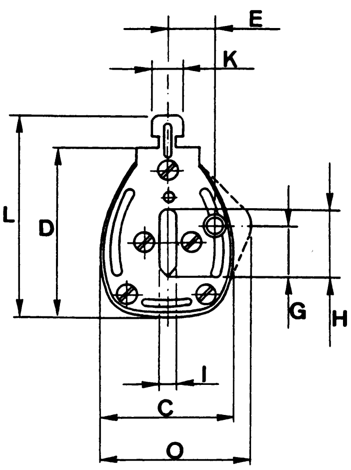
Ratings – aM with Striker

SIZE	RATED In CURRENT (A)	RATED VOLTAGE	CATALOG NUMBER	REFERENCE NUMBER	INTERRUPTING RATING (A)	STANDARD PACK
OS	32	690V	37443	Z213140	80kA - 690v	
	40		37447	R213639		
	50		37451	V214148		
	63		37455	Y214657		
0	80		37459	C215167		3
	100		37463	F215676		
	125		37465	L216187		
	160		37469	J216691		
	200	500V	37471	X217209	120kA - 500V	
1	80	690V	37559	C217720	80kA - 690V	3
	100		37563	M218235		
	125		37565	A218753		
	160		37569	P219272		
	200		37571	B222480		
	250		37575	T223002		
	315	500V	37579	A200790		
2	125	690V	37665	S201335	80kA - 690V	3
	160		37669	B201849		
	200		37671	Y211069		
	224		37673	P211590		
	250		37675	Y212104		
	315		37679	N212624		
	355		37681	A213141		
	400		37683	S213640		
	500	500V	37687	W214149	120kA - 500V	
3	315	690V	37779	Z214658	80kA - 690V	3
	355		37781	D215168		
	400		37783	G215677		
	500		37787	M216188		
	630	500V	37789	K216692	120kA - 500V	

Dimensions

	0	1	2	3
A	124.5	134.5	150	150
B	66	67	67	67
C	39	40	56	69
D	49	55	62.5	76
E	14.5	16	19	24
F	15.5	15.5	15.5	15.5
G	14	14.5	14.5	14.5
H	15	20	26	32
I	6	6	6	6
J	14	14	15	16
K	10	10	10	10
L	59	65	72.5	86
M	60	61	61	61
N	3	3	3	3
O	41.5	45	-	-
P	47	52	60	60





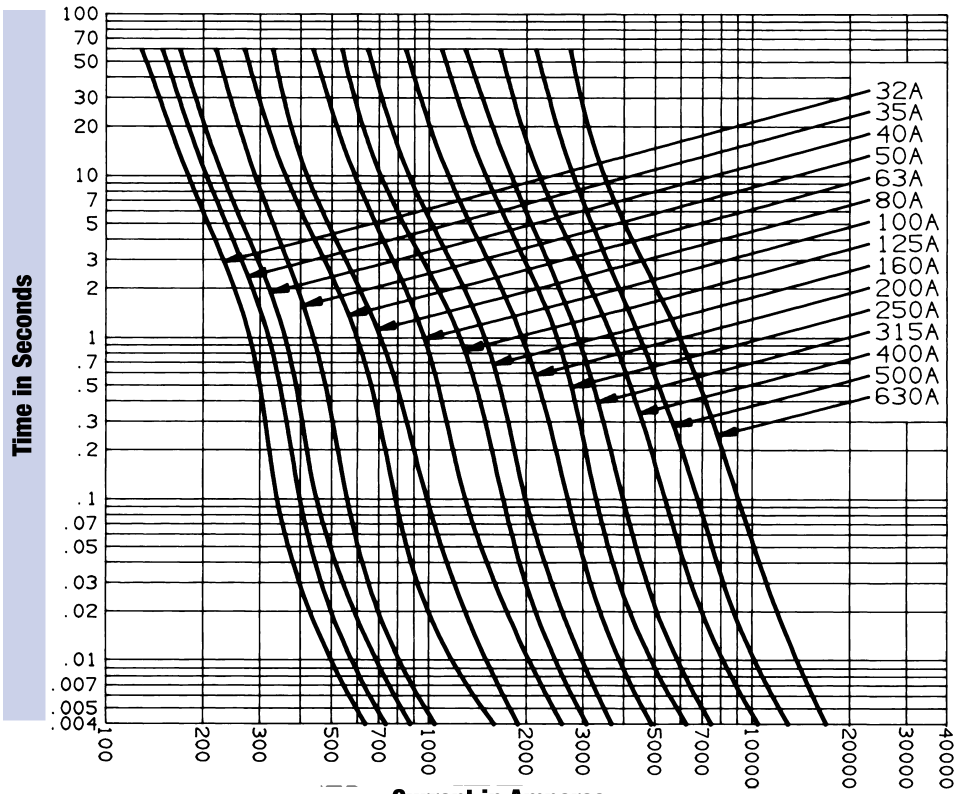
Ferraz Shawmut

General Purpose Fuses

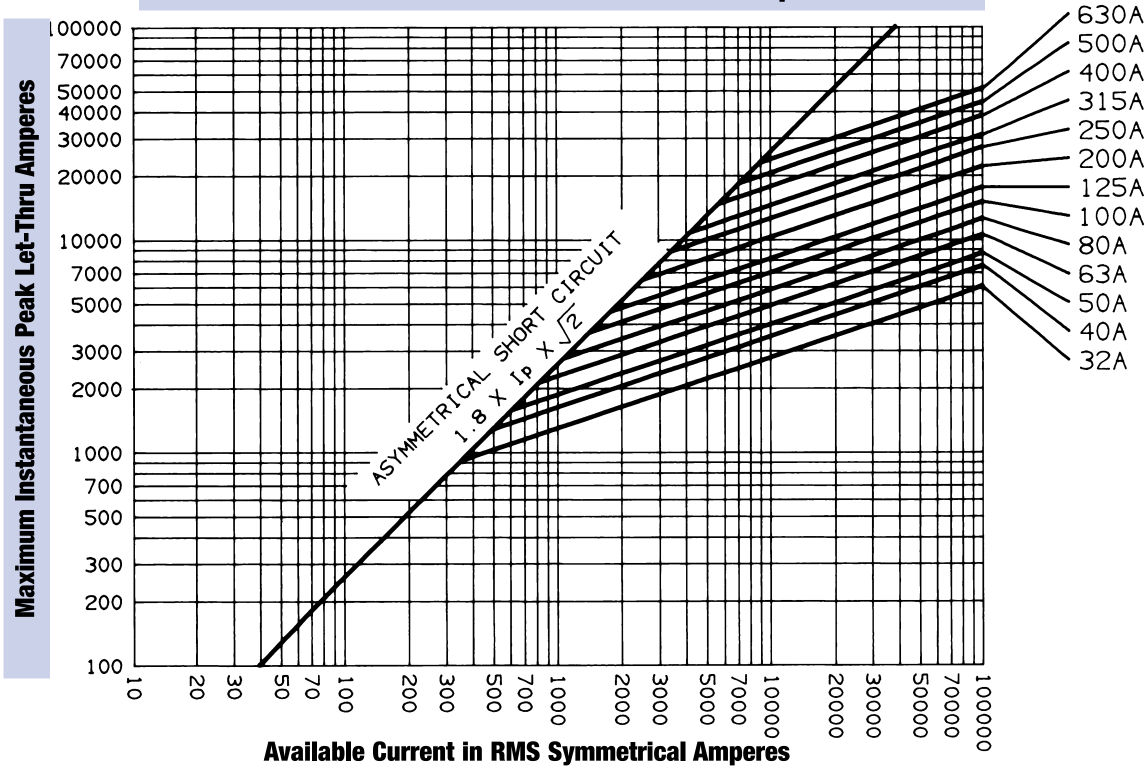
NH Fuses

aM with striker

Melting Time - Current Data – 32-630 Amperes



Peak Let-Thru Current Data – 32-630 Amperes

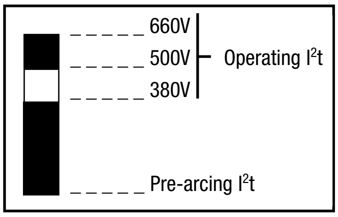


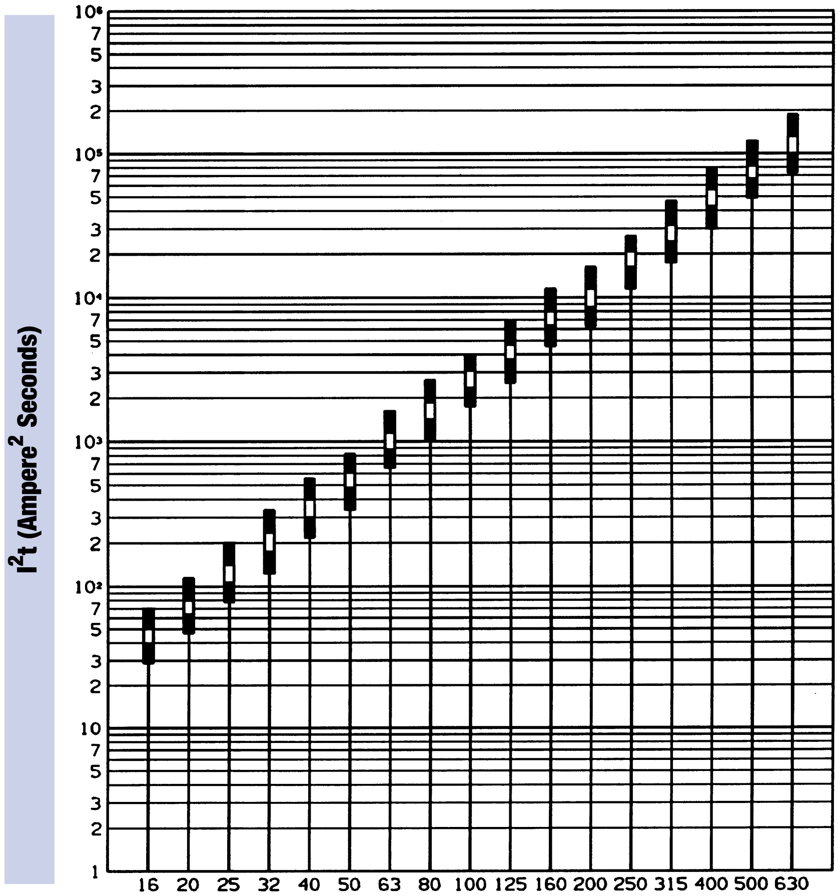
aM with striker

Power Loss (Watts) at Rated Current

RATED CURRENT In (A)	SIZE				
	00	0/0S	1	2	3
16	1.1 W				
20	1.4 W				
25	1.7 W				
32	2.2 W				
35	2.4 W	2.4 W			
40	2.8 W	2.8 W			
50	3.6 W	3.6 W	3.6 W		
63	4.6 W	4.6 W	4.6 W	4.6 W	
80	6.0 W	6.0 W	6.0 W	6.0 W	
100	7.5 W	7.5 W	7.5 W	7.5 W	
125	9.5 W	9.5 W	9.9 W	9.6 W	
160	10.7 W	12.0 W	12.7 W	12.7 W	
200			16.4 W	16.4 W	
224			18.7 W	18.7 W	
250			21.5 W	21.5 W	
315				29.0 W	25.0 W
355				32.0 W	29.0 W
400				34.0 W	34.0 W
425					38.5 W
500					45.0 W
630					60.0 W

I^2t Characteristics – Discrimination





Fuse-link Rated Current In (A)

General Purpose Fuses

NH Fuses

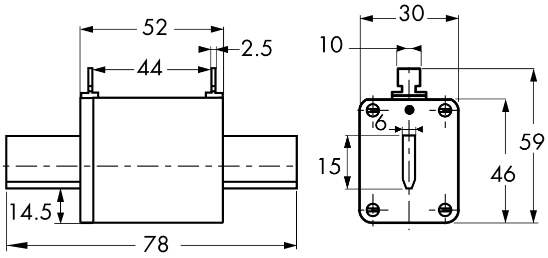
gG

500V

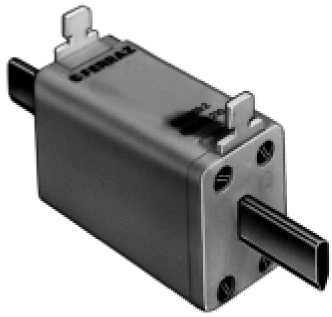
LOW VOLTAGE FUSES

from 10 to 160 A
Size: 00

- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1 NF EN 60269.1 & 2 NF C 63210 AND DIN 43620 STANDARDS
- DIMENSIONS



Weight: 150 g



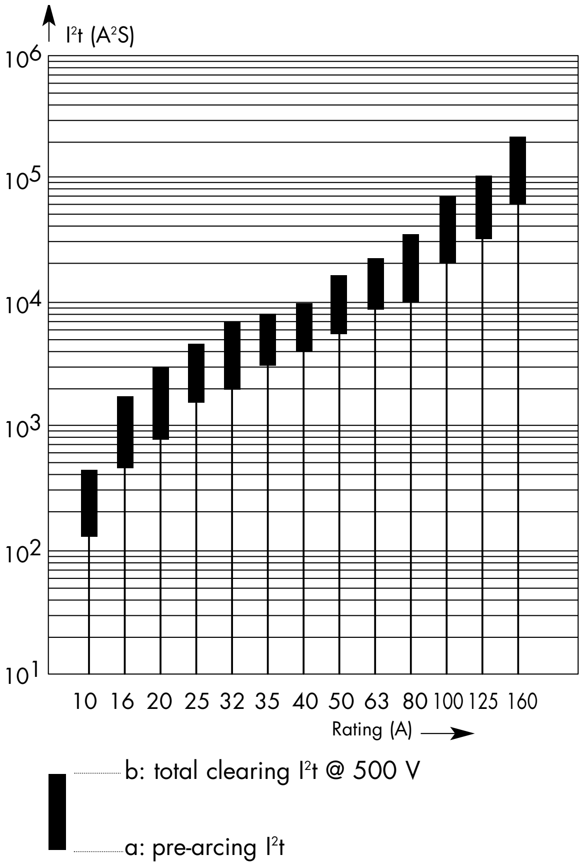
MAIN CHARACTERISTICS

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	WITH BLOWN FUSE INDICATOR	
				Catalog Number	Reference Number
00	500 V	10	1	gG 00 L / 10	M 098290
		16	1.4	gG 00 L / 16	N 098291
		20	1.8	gG 00 L / 20	P 098292
		25	2.1	gG 00 L / 25	Q 098293
		32	3	gG 00 L / 32	R 098294
		35	3	gG 00 L / 35	S 098295
		40	3.3	gG 00 L / 40	T 098296
		50	4.5	gG 00 L / 50	V 098297
		63	6	gG 00 L / 63	X 098299
		80	7	gG 00 L / 80	Z 098301
		100	7.5	gG 00 L /100	A 098302
		125	13	gG 00 L /125	B 098303
		160	15	gG 00 L /160	D 098305

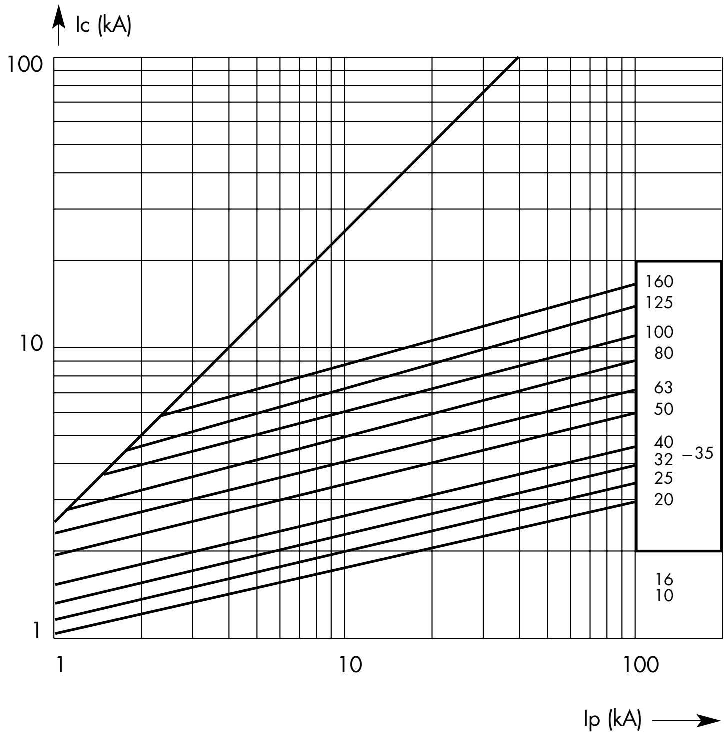
Accessories: Neutral link BS00 - Part # F 097709
Pull-out handle - PMP - Part # E 097708

gG 500V

TOTAL CLEARING I²t



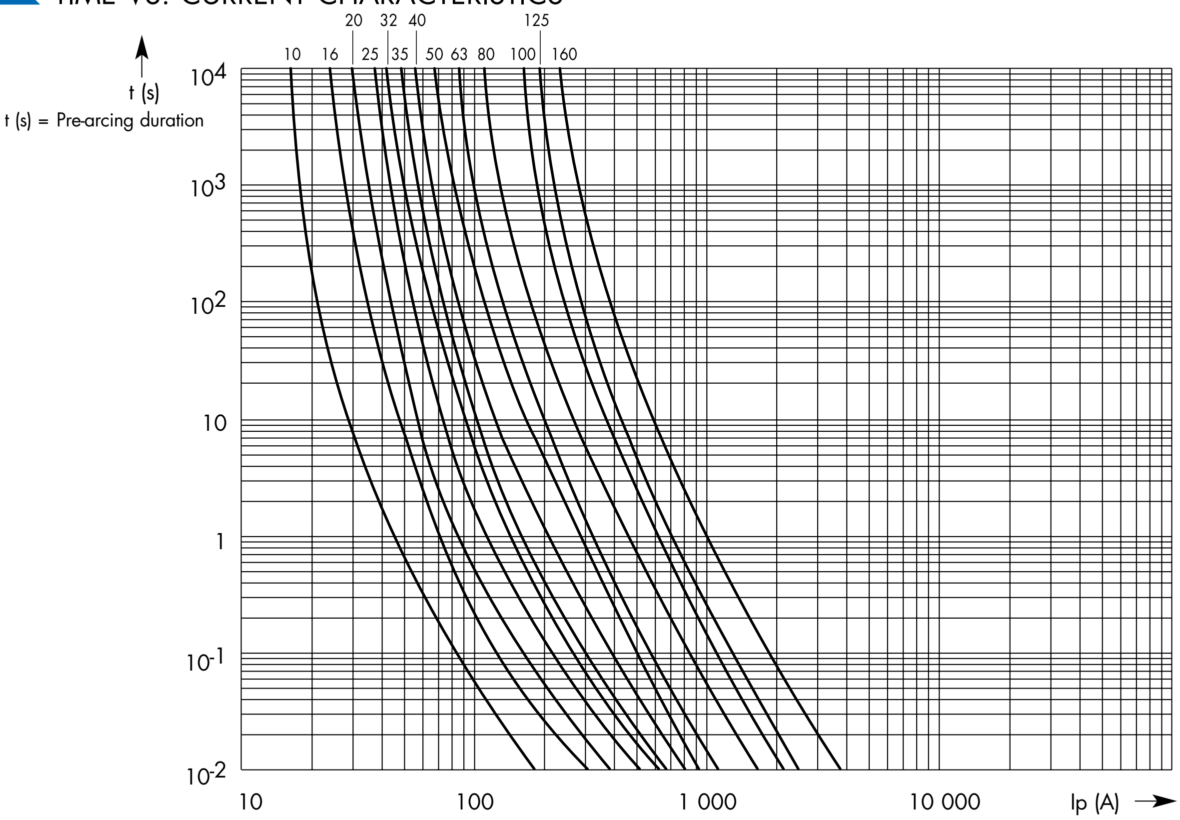
CURRENT LIMITATION CURVES



Ic = Peak let-through current

Ip = Available fault current

TIME VS. CURRENT CHARACTERISTICS



Interrupting rating 100 kA

Ip (A) = R.M.S. available fault current

General Purpose Fuses

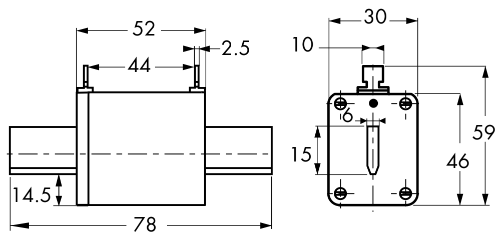
NH Fuses

gG 500V

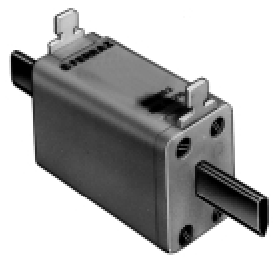
LOW VOLTAGE FUSES

from 40 to 250 A
Sizes: 0 - 1

- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1 NF EN 60269.1 & 2 NF C 63210 - 63211 AND DIN 43620
- DIMENSIONS



With trip-indicator



With blown fuse indicator

Size	A	B	C	D	D1	D2*	F*	G	H	J	K	L	M	N	e	Wgt.
0	46	62	59	67	36	39	14	2,5	15	14,5	14,5	125	10	14,5	6	230g
1	52	64	64	74	47	47	14	3	21	16	14,5	135	10	14,5	6	400g

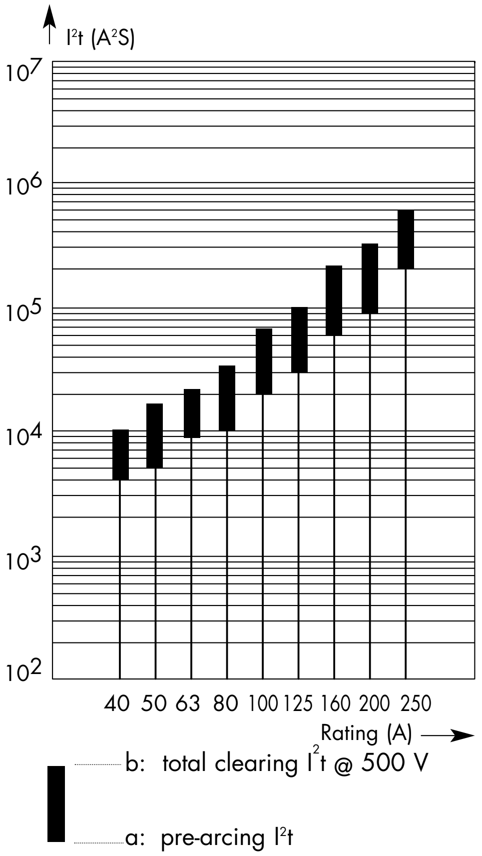
* For fuses with trip-indicator

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator		With trip-indicator	
				Catalog Number	Ref. Number	Catalog Number	Ref. Number
0	500 V	40	4.2	gG 0 / 40	A 095013	gG 0 / 40 P	T 095214
		50	5.5	gG 0 / 50	B 095014	gG 0 / 50 P	V 095215
		63	6.5	gG 0 / 63	C 095015	gG 0 / 63 P	W 095216
		80	8.5	gG 0 / 80	D 095016	gG 0 / 80 P	Y 095218
		100	9.5	gG 0 / 100	E 095017	gG 0 / 100 P	A 095220
		125	12	gG 0 / 125	F 095018	gG 0 / 125 P	C 095222
		160	15	gG 0 / 160	G 095019	gG 0 / 160 P	G 095226
		200	19	gG 0 / 200	H 095020		
1	500 V	80	8.5	gG 1 / 80	K 095022	gG 1 / 80 P	D 095591
		100	9.6	gG 1 / 100	P 095026	gG 1 / 100 P	E 095592
		125	12.5	gG 1 / 125	T 095030	gG 1 / 125 P	F 095593
		160	15	gG 1 / 160	V 095031	gG 1 / 160 P	G 095594
		200	19	gG 1 / 200	W 095032	gG 1 / 200 P	H 095595
		250	23	gG 1 / 250	Z 095035	gG 1 / 250 P	K 095597

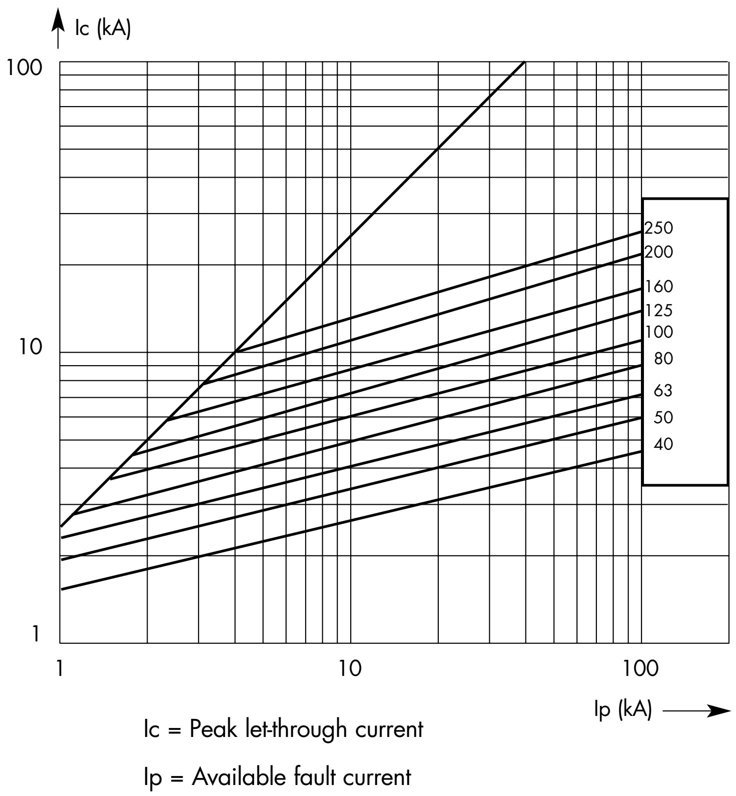
Accessories: Neutral link BS0 Reference Number G 097710 - BS1 Reference Number H 097711
Pull-out handle - PMP Reference Number E 097708

gG 500V

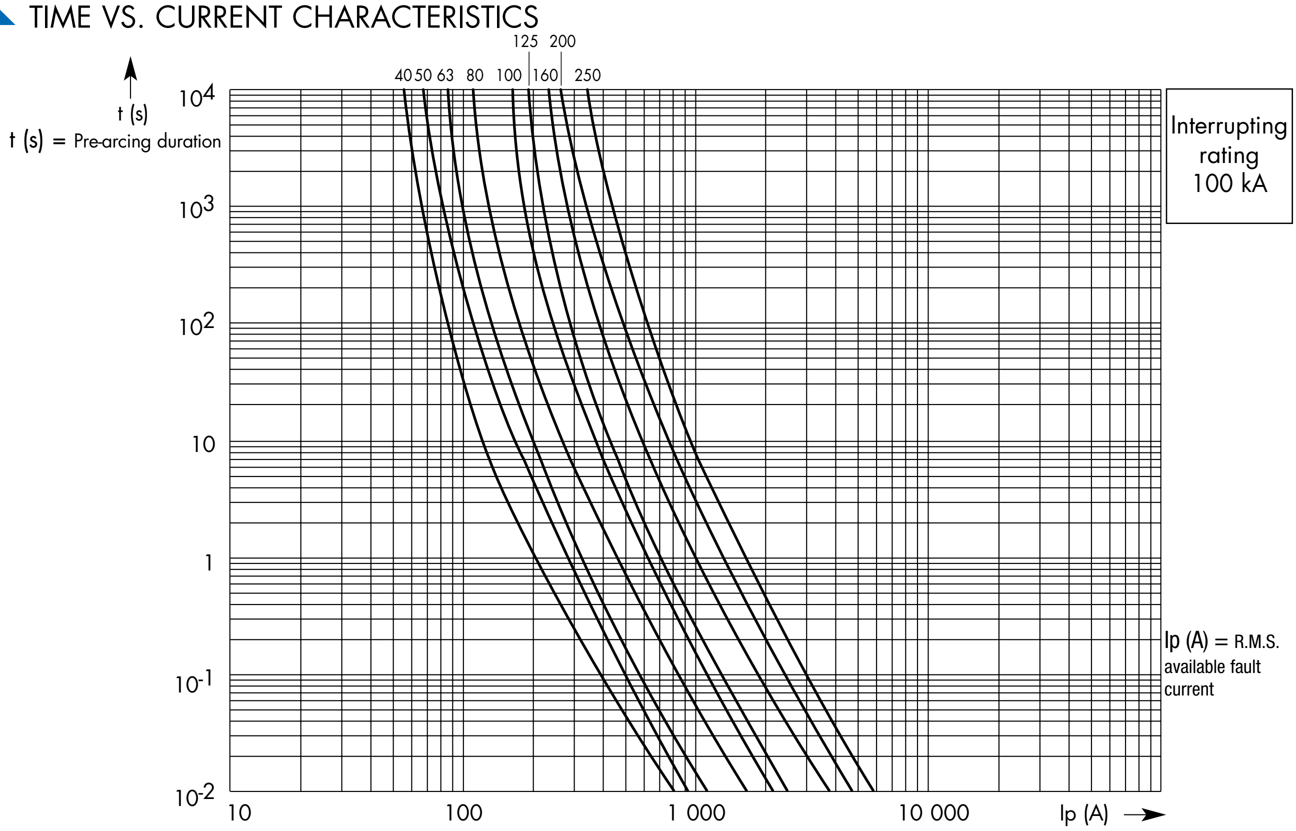
TOTAL CLEARING I²t



CURRENT LIMITATION CURVES



TIME VS. CURRENT CHARACTERISTICS



General Purpose Fuses

NH Fuses

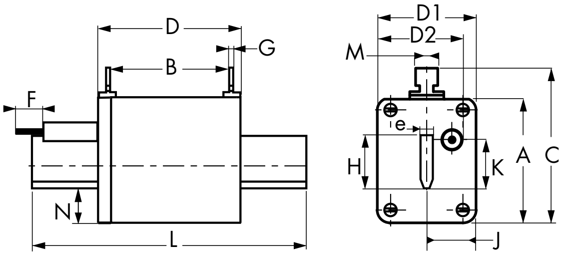
gG

500V

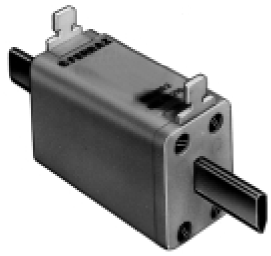
LOW VOLTAGE FUSES

from 125 to 630 A
Sizes: 2 - 3

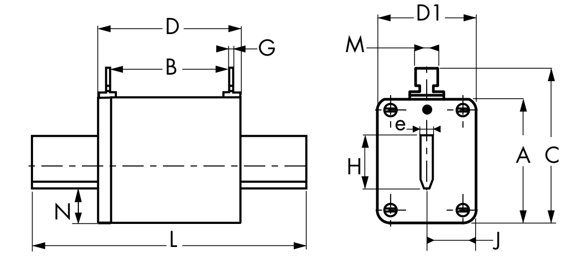
- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1, NF EN 60269.1 & 2 NF C 63210 - 63211 AND DIN 43620
- DIMENSIONS



With trip-indicator



With blown fuse indicator



Size	A	B	C	D	D1	D2*	F*	G	H	J	K	L	M	N	e	Wgt.
2	60	64	72	74	50	50	14	3	28	19	14,5	150	10	14,5	6	590g
3	75	61	88	75	70	64	14	2,5	36	23	14,5	150	10	18	6	850g

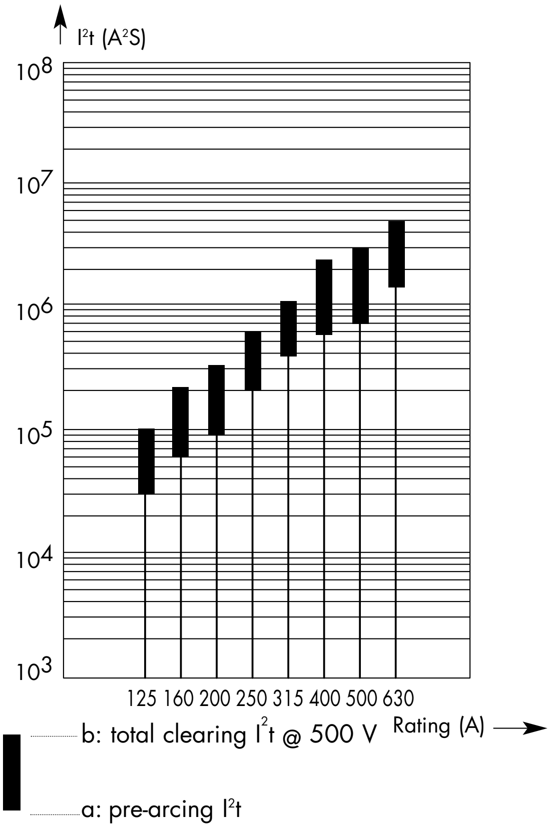
* For fuses with trip-indicator

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator		With trip-indicator	
				Catalog Number	Reference Number	Catalog Number	Ref. Number
2	500 V	125	12	gG 2 /125	H 095066	gG 2 /125 P	X 095033
		160	15	gG 2 /160	K 095068	gG 2 /160 P	Y 095034
		200	19	gG 2 /200	M 095070	gG 2 /200 P	A 095036
		250	23	gG 2 /250	G 095042	gG 2 /250 P	F 095041
		315	24	gG 2 /315	H 095043	gG 2 /315 P	K 095045
		400	33	gG 2 /400	J 095044	gG 2 /400 P	M 095047
3	500 V	315	24	gG 3 /315	W 095170	gG 3 /315 P	N 095048
		400	33	gG 3 /400	V 095054	gG 3 /400 P	P 095049
		500	36	gG 3 /500	W 095055	gG 3 /500 P	N 095071
		630	45	gG 3 /630	X 095056	gG 3 /630 P	P 095072

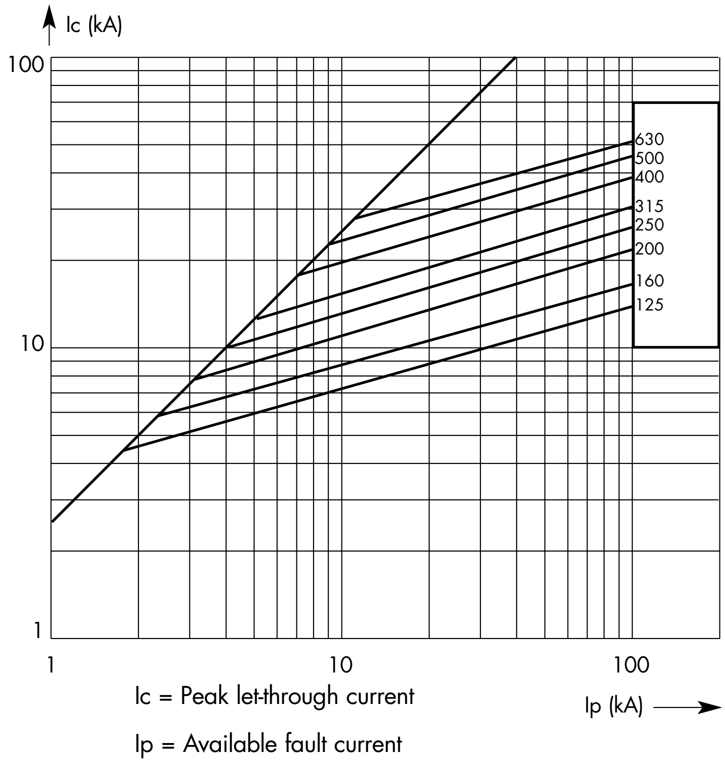
Accessories : Neutral link BS2 Reference Number J 097712 - BS3 Reference Number K 097713
Pull-out handle - PMP Reference Number E 097708

gG 500V

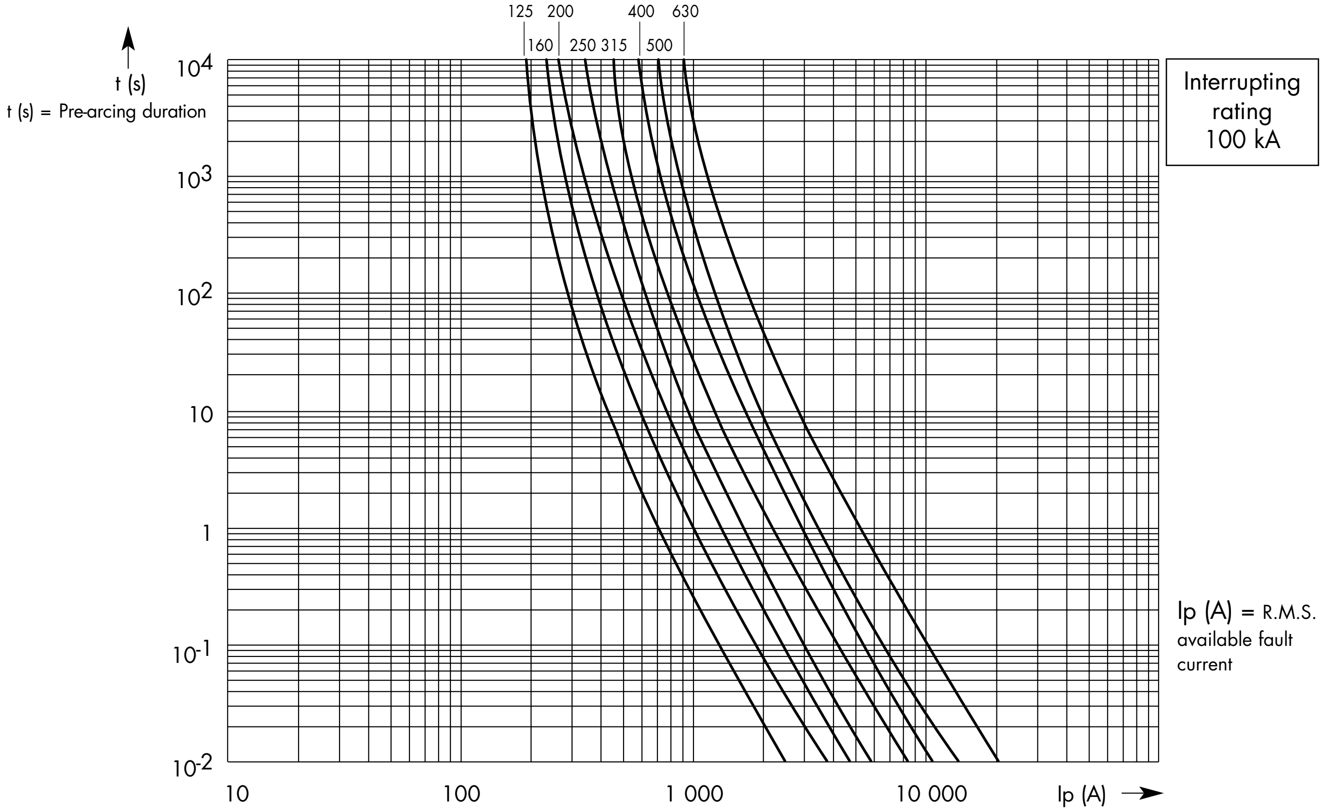
TOTAL CLEARING I²t



CURRENT LIMITATION CURVES



TIME VS. CURRENT CHARACTERISTICS



Ferraz Shawmut

General Purpose Fuses

NH Fuses

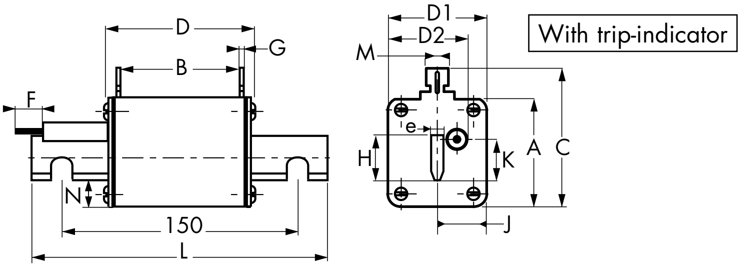
gG

500V

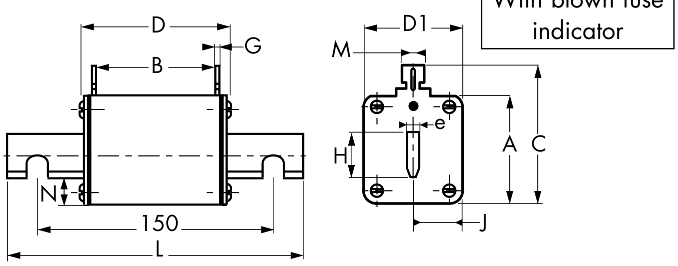
LOW VOLTAGE FUSES

from 630 to 1250 A
Size: 4

- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1, NF EN 60269.1 & 2 NF C 63210 - 63211 AND DIN 43620
- DIMENSIONS







Size	A	B	C	D	D1	D2*	F*	G	H	J	K	L	M	N	e	Poids
4	107	61	119	78	90	77	14	2,5	60	27	14,5	200	10	23	8	1900g

* For fuses with trip-indicator

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator		With trip-indicator	
				Catalog Number	Ref. Number	Catalog Number	Ref. Number
4	500 V	630	45	gG 4 / 630	S 098318	gG 4 / 630 P	G 088510
		800	51	gG 4 / 800	T 098319	gG 4 / 800 P	J 088512
		1000	77	gG 4 /1000	V 098320	gG 4 /1000 P	K 088513
		1250	80	gG 4 /1250	W 098321	gG 4 /1250 P	L 088514

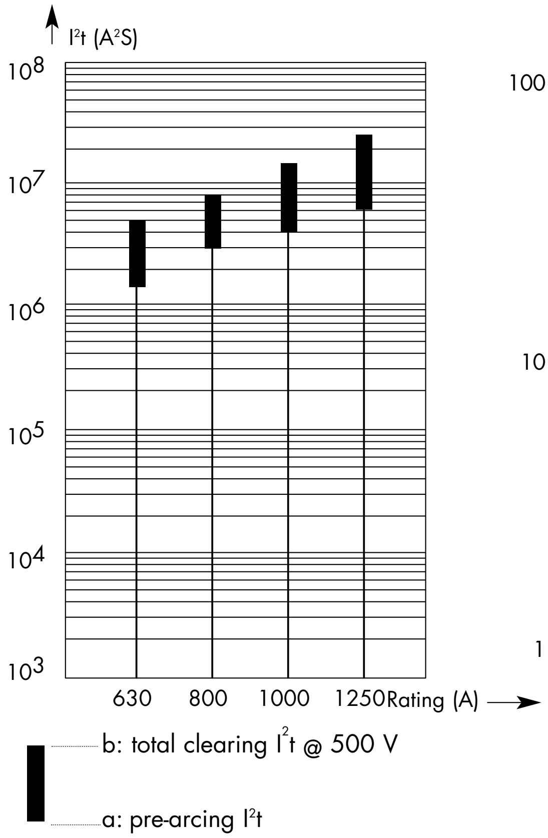
Accessories: Neutral link - BS4 Reference Number M 097715
Pull-out handle - PMP Reference Number E 097708

General Purpose Fuses

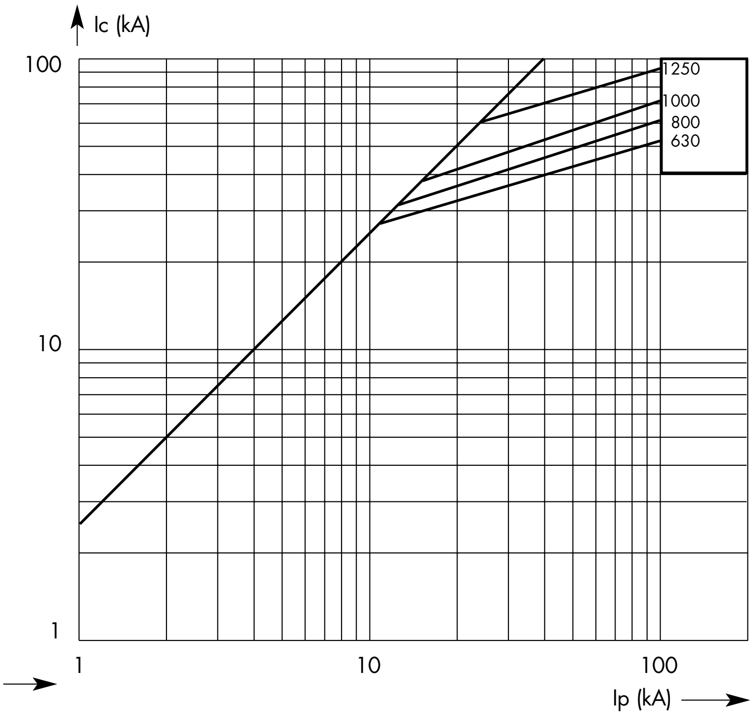
NH Fuses

gG **500V**

TOTAL CLEARING I²t



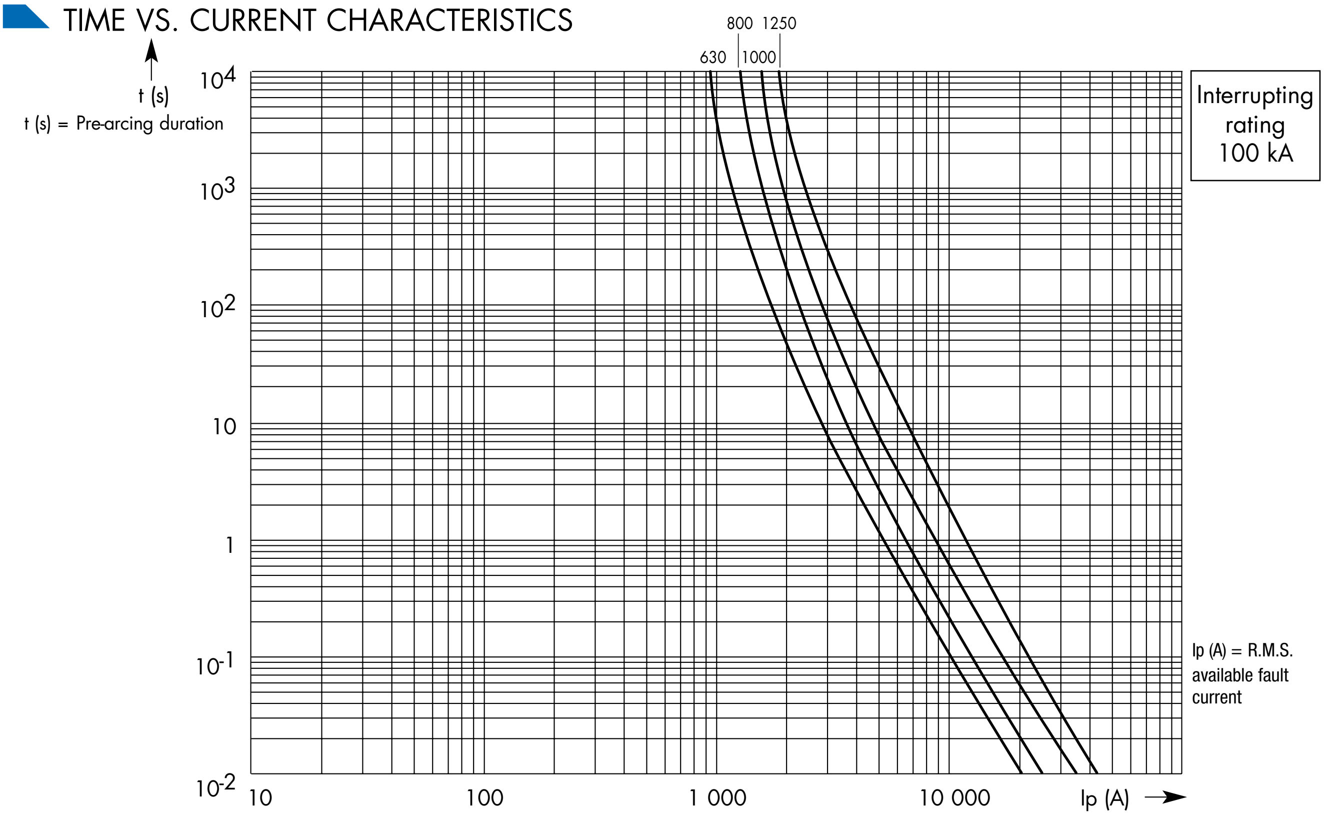
CURRENT LIMITATION CURVES



Ic = Peak let-through current

Ip = Available fault current

TIME VS. CURRENT CHARACTERISTICS



Ferraz Shawmut

NH Fuses

aM 500V

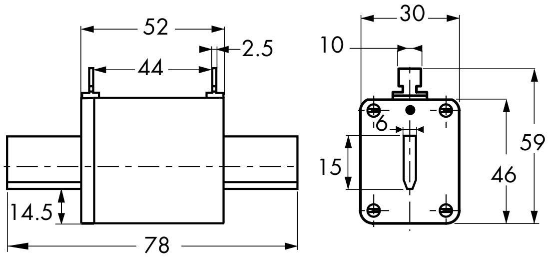
LOW VOLTAGE FUSES

from 16 to 125 A
Size: 00

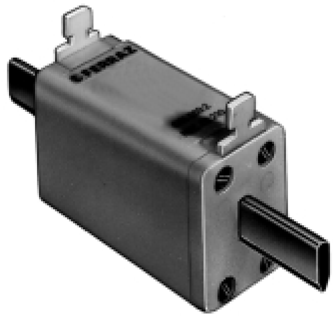
- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR

- COMPLYING WITH IEC 269.1 AND 2.1 NF EN 60269.1 & 2 NF C 63210 AND DIN 43620 STANDARDS

- DIMENSIONS



Weight: 150 g

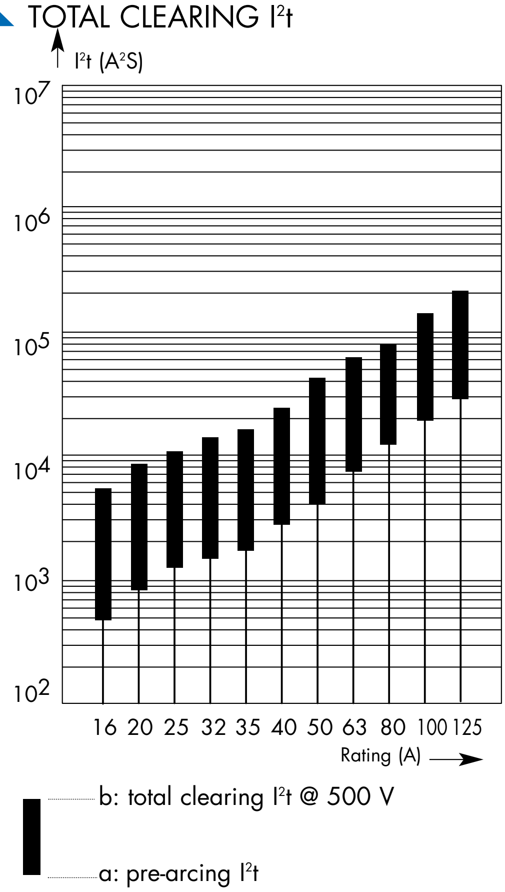


Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator	
				Catalog Number	Reference Number
		16	0.8	aM 00 L / 16	F 098307
		20	1.1	aM 00 L / 20	G 098308
		25	1.3	aM 00 L / 25	H 098309
		32	1.8	aM 00 L / 32	J 098310
		35	2.0	aM 00 L / 35	K 098311
00	500 V	40	2.5	aM 00 L / 40	L 098312
		50	3.0	aM 00 L / 50	M 098313
		63	3.6	aM 00 L / 63	N 098314
		80	5.2	aM 00 L / 80	P 098315
		100	6.0	aM 00 L /100	Q 098316
		125	7.0	aM 00 L /125	R 098317

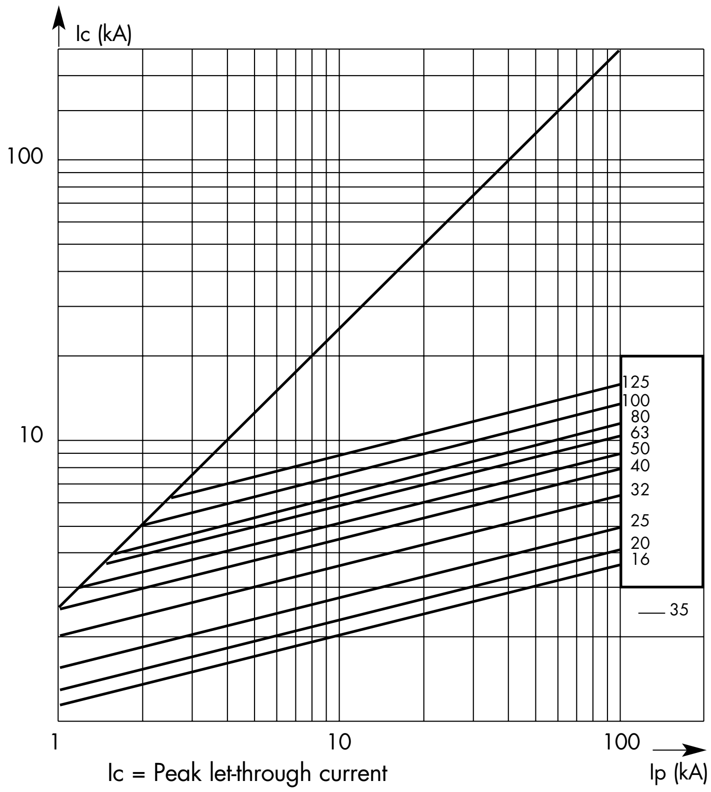
Accessories: Neutral link BS00 - Reference Number F 097709
Pull-out handle - PMP - Reference Number E 097708

aM 500V

TOTAL CLEARING I²t



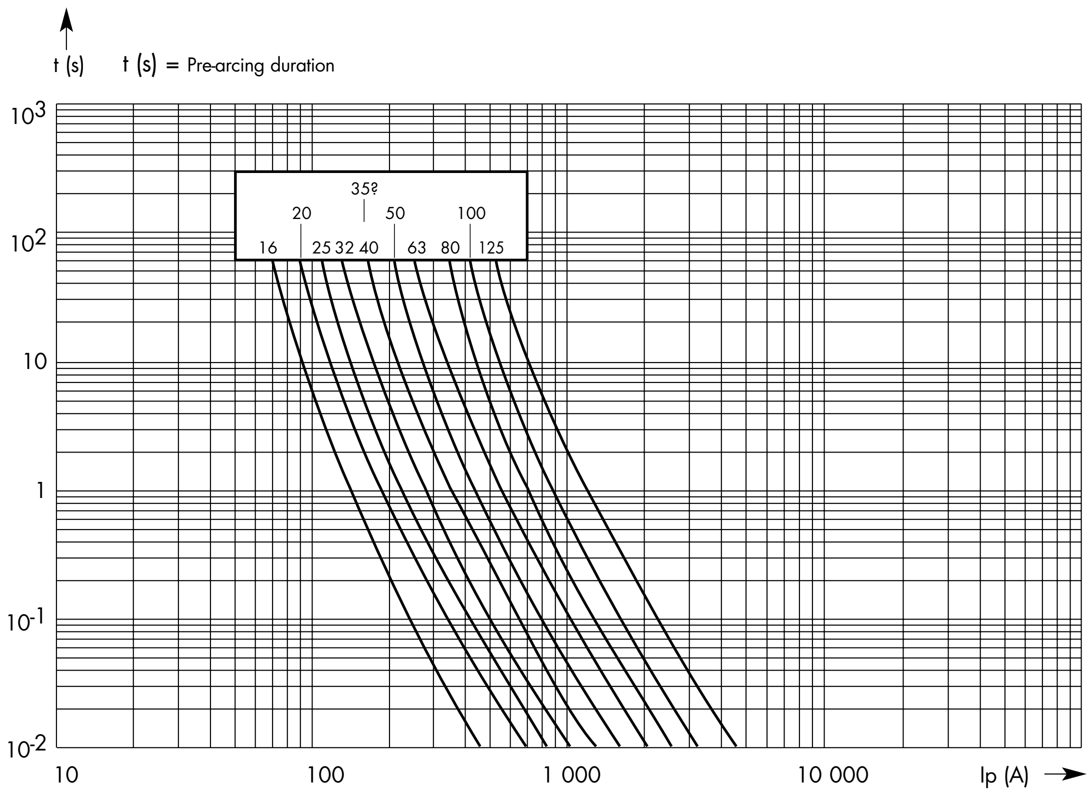
CURRENT LIMITATION CURVES



Ic = Peak let-through current

Ip = Available fault current

TIME VS. CURRENT CHARACTERISTICS



Interrupting rating 100 kA

Ip (A) = R.M.S. available fault current

Ferraz Shawmut

General Purpose Fuses

NH Fuses

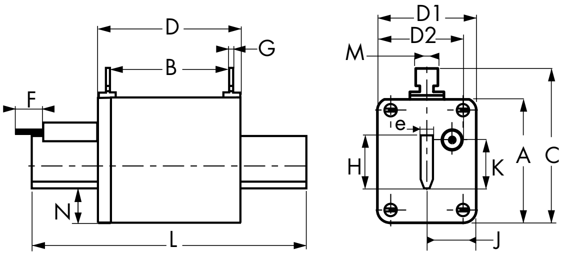
aM

500V

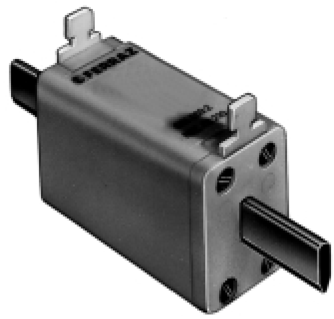
LOW VOLTAGE FUSES

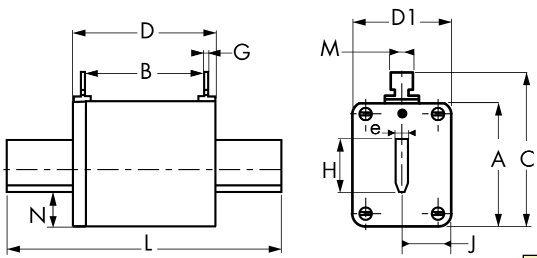
from 40 to 315 A
Sizes: 0 - 1

- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1, NF EN 60269.1 & 2 NF C 63210 - 63211 AND DIN 43620
- DIMENSIONS



With trip-indicator





With blown fuse indicator

Size	A	B	C	D	D1	D2*	F*	G	H	J	K	L	M	N	e	Wgt.
0	46	62	59	67	36	39	14	2,5	15	14,5	14,5	125	10	14,5	6	230g
1	52	64	64	74	47	47	14	3	21	16	14,5	135	10	14,5	6	400g

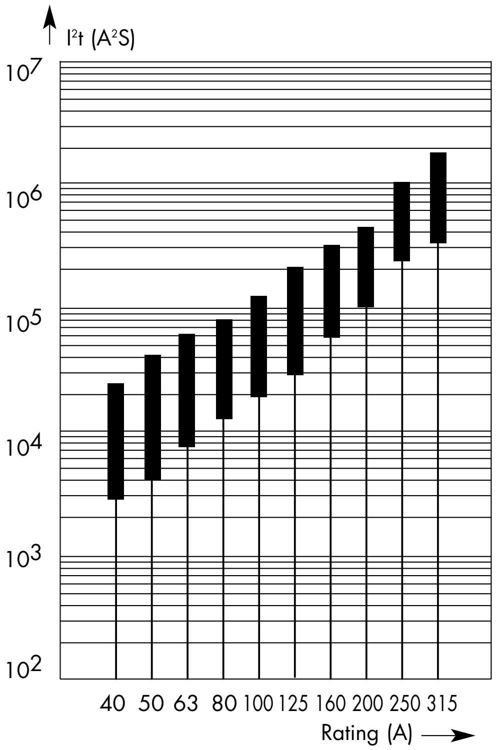
* For fuses with trip-indicator

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator		With trip-indicator	
				Catalog Number	Ref. Number	Catalog Number	Ref. Number
0	500 V	40	2,7	aM 0 / 40	K 095114	aM 0 / 40 P	N 095232
		50	3,2	aM 0 / 50	L 095115	aM 0 / 50 P	R 095235
		63	3,9	aM 0 / 63	M 095116	aM 0 / 63 P	X 095240
		80	5,5	aM 0 / 80	P 095118	aM 0 / 80 P	Z 095242
		100	6,5	aM 0 /100	R 095120	aM 0 /100 P	A 095243
		125	8,5	aM 0 /125	T 095122	aM 0 /125 P	B 095244
		160	11,5	aM 0 /160	Y 095126	aM 0 /160 P	M 095254
		200	13,5	aM 0 /200	R 088519	aM 0 /200 P	F 088509
1	500 V	80	5,5	aM 1 / 80	R 095166	aM 1 / 80 P	P 095256
		100	6,5	aM 1 /100	T 095168	aM 1 /100 P	E 095270
		125	8,5	aM 1 /125	C 095130	aM 1 /125 P	V 095330
		160	11,5	aM 1 /160	D 095131	aM 1 /160 P	W 095331
		200	13,5	aM 1 /200	E 095132	aM 1 /200 P	X 095332
		250	17	aM 1 /250	H 095135	aM 1 /250 P	A 095335
		315	24	aM 1 /315	T 088521	aM 1 /315 P	B 095336

Accessories: Neutral link BS0 Reference Number G 097710 - BS1 Reference Number H 097711
Pull-out handle - PMP Reference Number E 097708

aM 500V

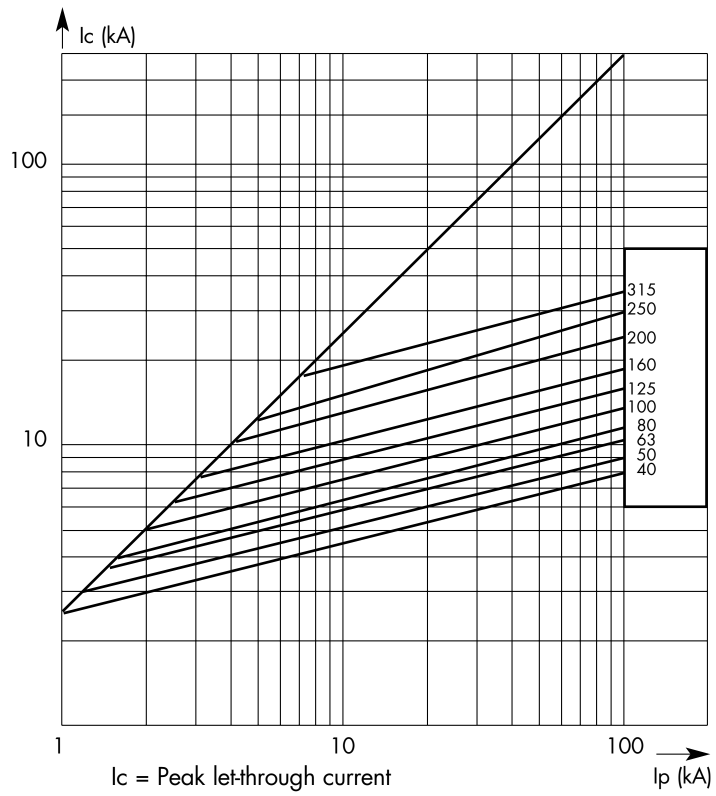
TOTAL CLEARING I²t



b: total clearing I^2t @ 500 V

a: pre-arcing I^2t

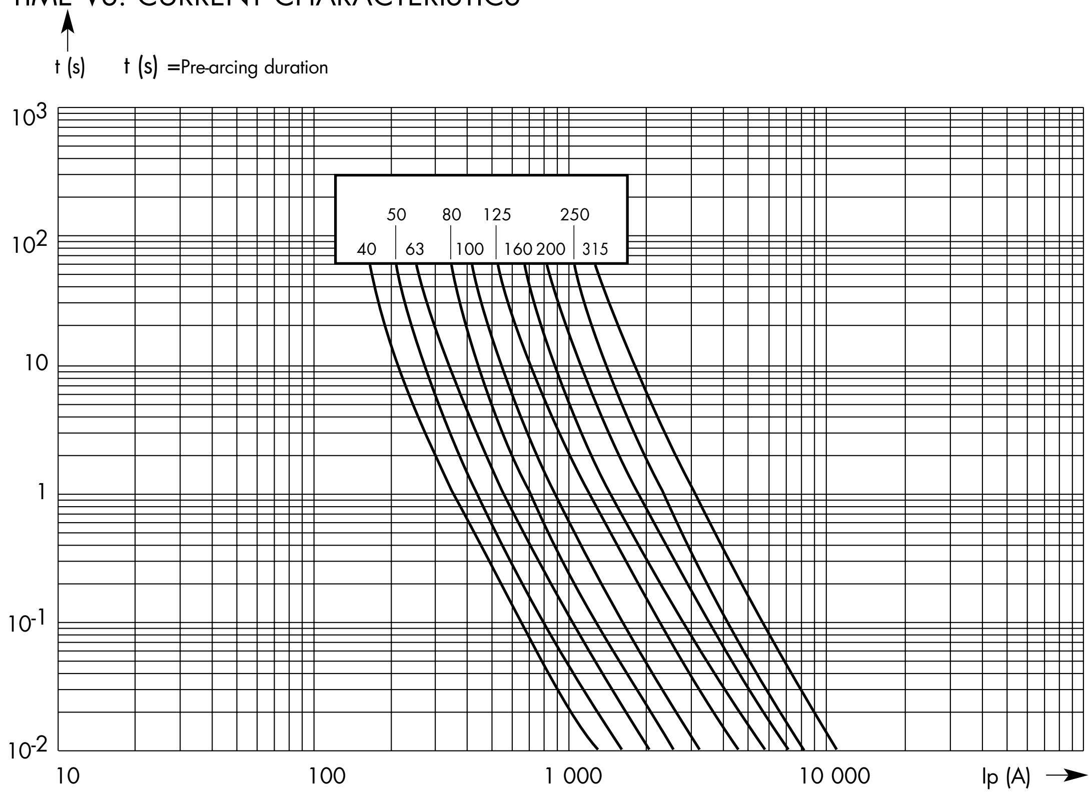
CURRENT LIMITATION CURVES



Ic = Peak let-through current

Ip = Available fault current

TIME VS. CURRENT CHARACTERISTICS



Interrupting rating 100 kA

Ip (A) = R.M.S. available fault current

General Purpose Fuses

NH Fuses

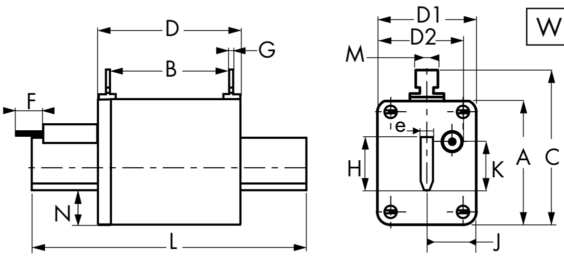
aM **500V**

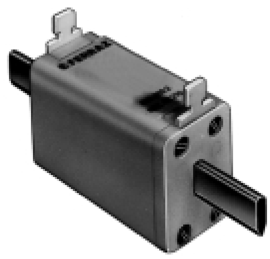
LOW VOLTAGE FUSES

from 125 to 630 A
Sizes: 2 - 3

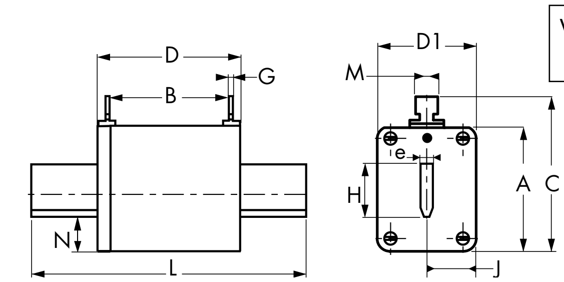
- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1, NF EN 60269.1 & 2 NF C 63210 - 63211 AND DIN 43620
- DIMENSIONS

With trip-indicator





With blown fuse indicator



Size	A	B	C	D	D1	D2*	F*	G	H	J	K	L	M	N	e	Wgt.
2	60	64	72	74	50	50	14	3	28	19	14,5	150	10	14,5	6	590g
3	75	61	88	75	70	64	14	2,5	36	23	14,5	150	10	18	6	850g

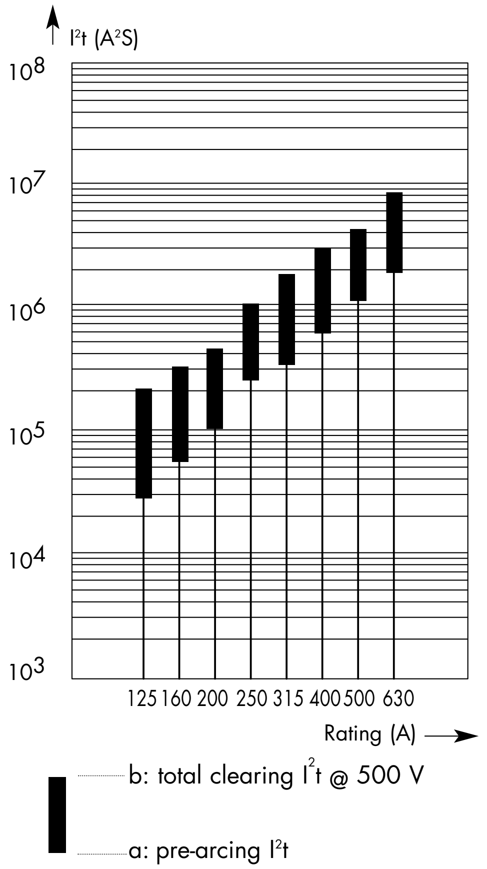
* For fuses with trip-indicator

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator		With trip-indicator	
				Catalog Number	Ref. Number	Catalog Number	Ref. Number
2	500 V	125	8,5	aM 2 /125	P 095210	aM 2 /125 P	Z 095196
		160	11,5	aM 2 /160	Q 095211	aM 2 /160 P	S 095213
		200	13,5	aM 2 /200	R 095212	aM 2 /200 P	F 095340
		250	17	aM 2 /250	Q 095142	aM 2 /250 P	H 095342
		315	24	aM 2 /315	R 095143	aM 2 /315 P	J 095343
		400	28	aM 2 /400	S 095144	aM 2 /400 P	K 095344
		500	34	aM 2 /500	W 088523	aM 2 /500 P	L 095345
3	500 V	315	24	aM 3 /315	J 095182	aM 3 /315 P	Q 095073
		400	28	aM 3 /400	D 095154	aM 3 /400 P	W 095354
		500	34	aM 3 /500	E 095155	aM 3 /500 P	X 095355
		630	41	aM 3 /630	F 095156	aM 3 /630 P	Y 095356

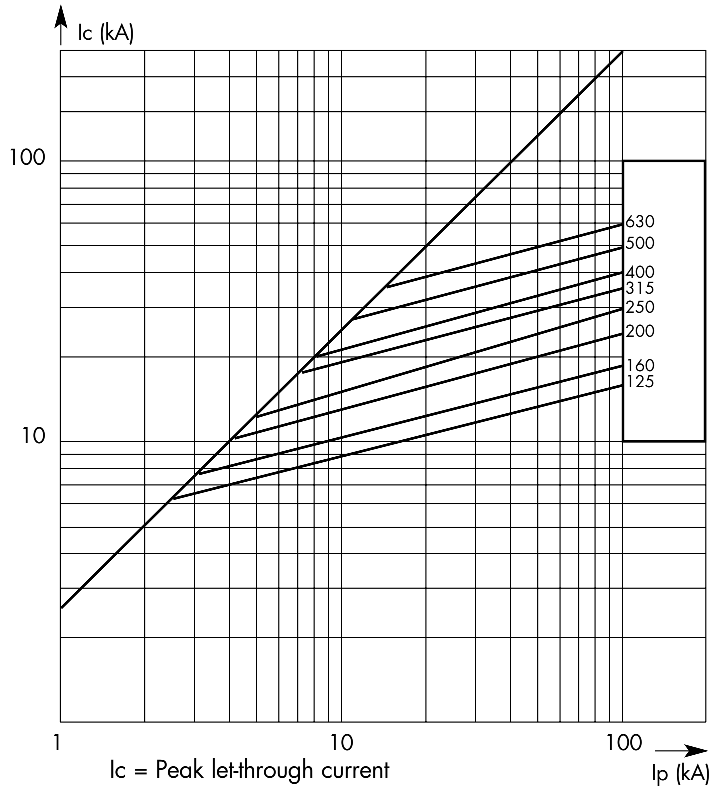
Accessories: Neutral link BS2 Reference Number J 097712 - BS3 Reference Number K 097713
Pull-out handle - PMP Reference Number E 097708

aM 500V

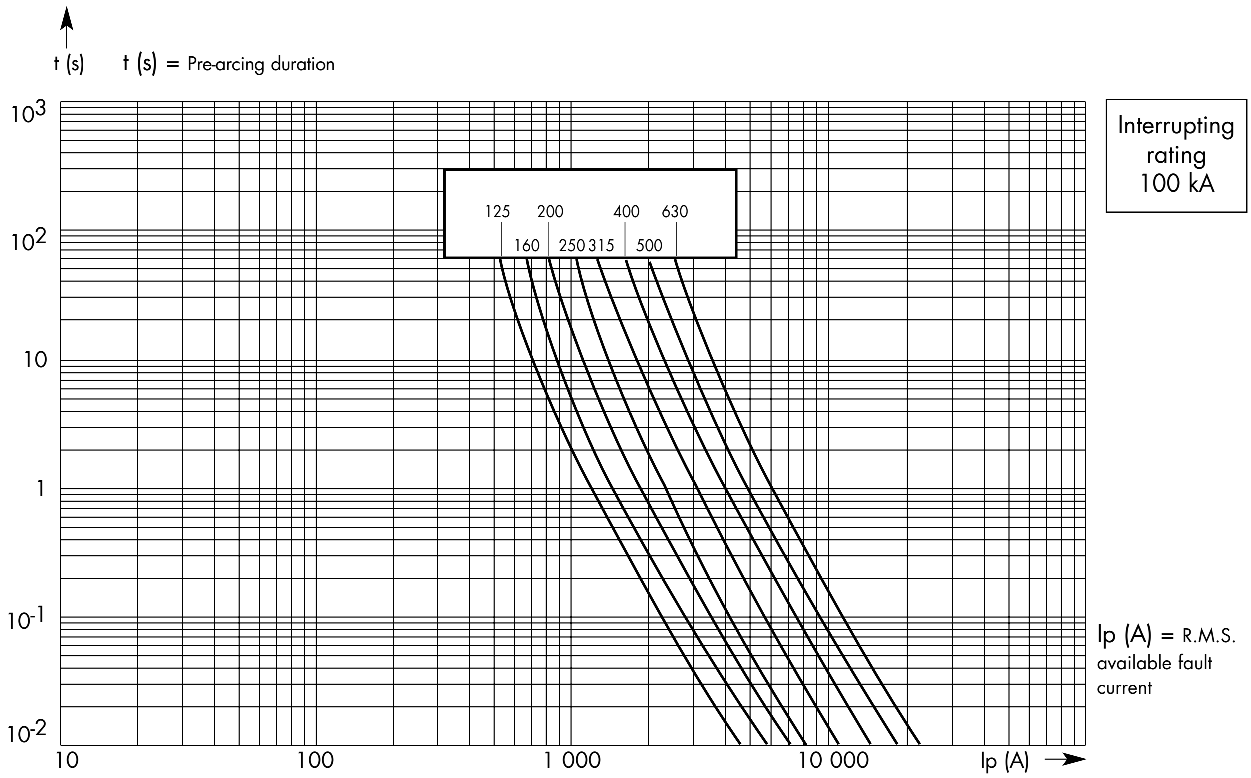
TOTAL CLEARING I²t



CURRENT LIMITATION CURVES



TIME VS. CURRENT CHARACTERISTICS

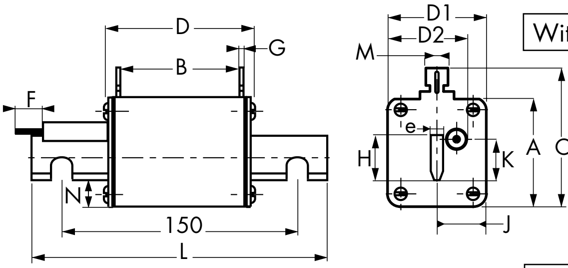


aM 500V

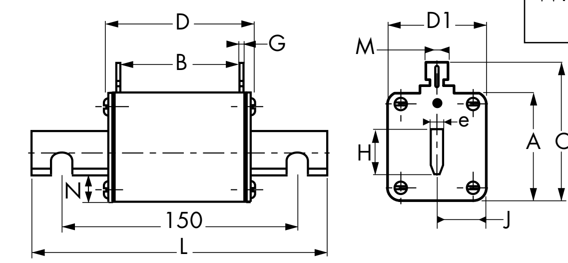
LOW VOLTAGE FUSES

from 630 to 1250 A
Size: 4

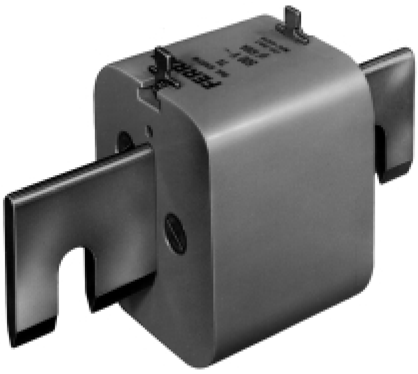
- BLADE-STYLE FUSES: WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- COMPLYING WITH IEC 269.1 AND 2.1, NF EN 60269.1 & 2 NF C 63210 - 63211 AND DIN 43620
- DIMENSIONS



With trip-indicator



With blown fuse indicator



Size	A	B	C	D	D1	D2*	F*	G	H	J	K	L	M	N	e	Wgt.
4	107	61	119	78	90	77	14	2,5	60	27	14,5	200	10	23	8	1900g

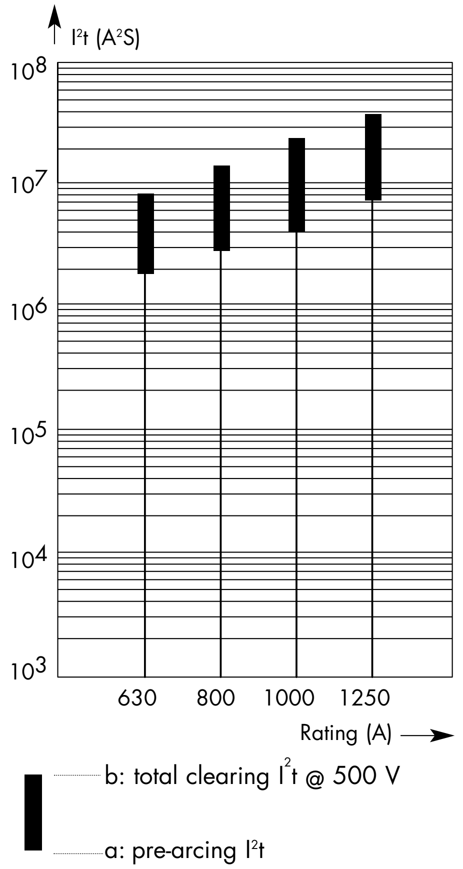
* For fuses with trip-indicator

Size	Voltage rating (V)	Current rating IN(A)	Watts loss	With blown fuse indicator		With trip-indicator	
				Catalog Number	Ref. Number	Catalog Number	Ref. Number
4	500 V	630	41	aM 4 / 630	X 098322	aM 4 / 630 P	M 088515
		800	49	aM 4 / 800	A 098325	aM 4 / 800 P	N 088516
		1000	70	aM 4 /1000	B 098326	aM 4 /1000 P	P 088517
	400 V	1250	75	aM 4 /1250	C 098327	aM 4 /1250 P	Q 088518

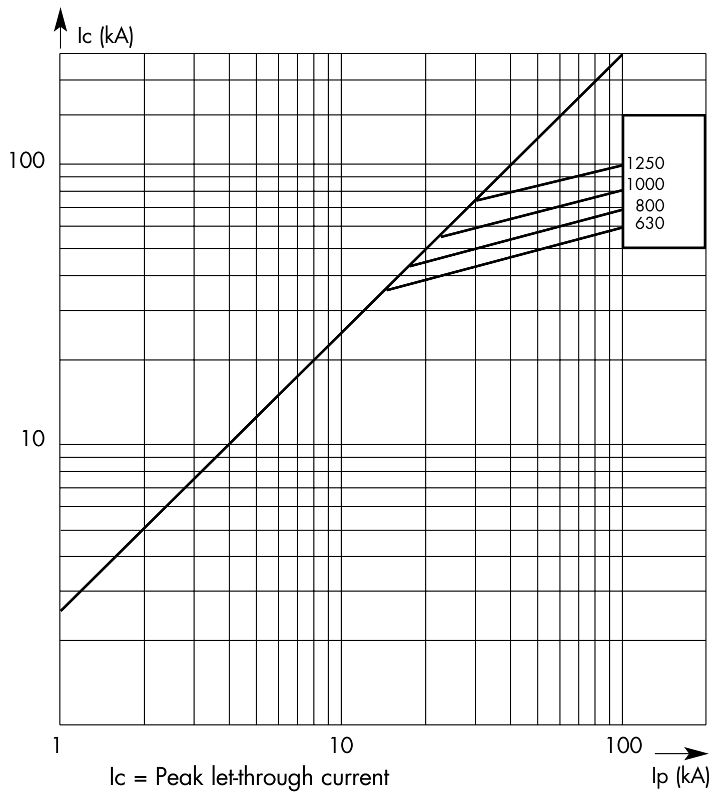
Accessories: Neutral link - BS4 Reference Number M 097715
Pull-out handle - PMP Reference Number E 097708

aM 500V

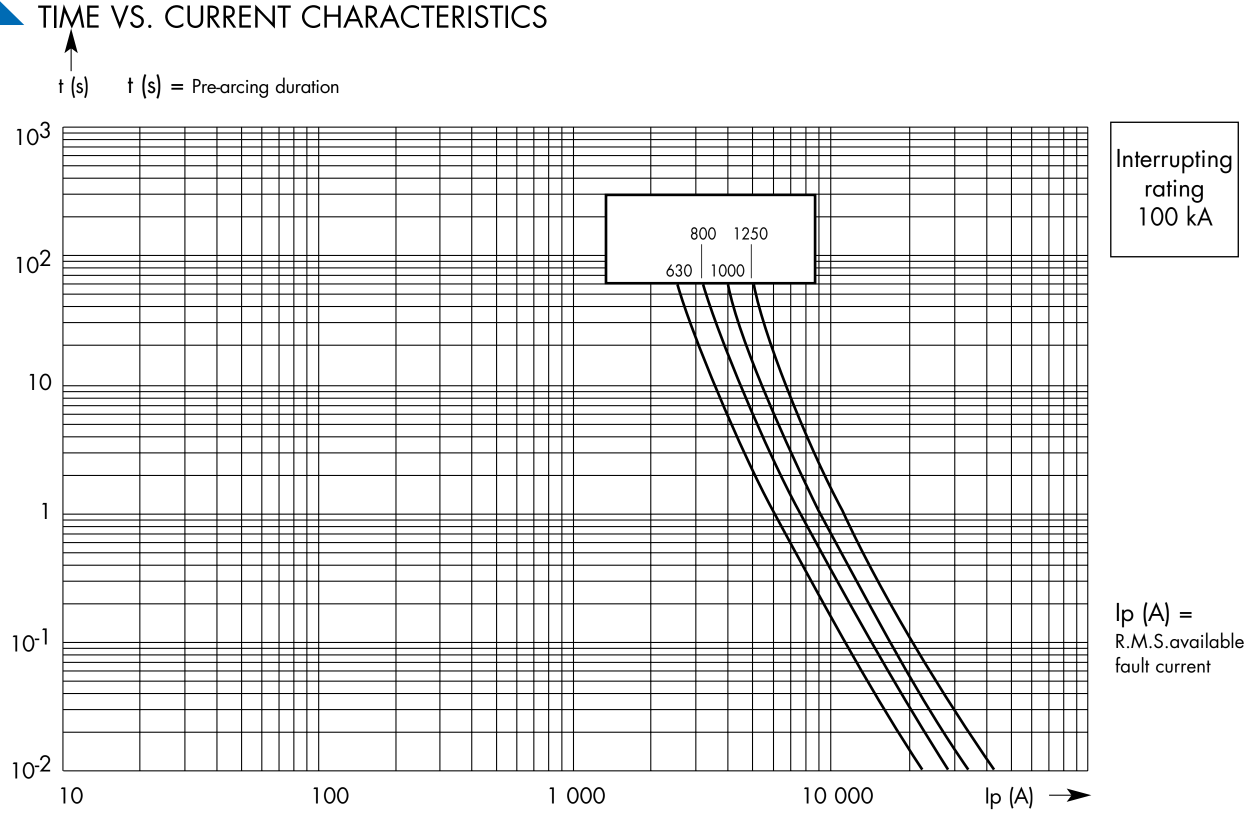
TOTAL CLEARING I²t



CURRENT LIMITATION CURVES

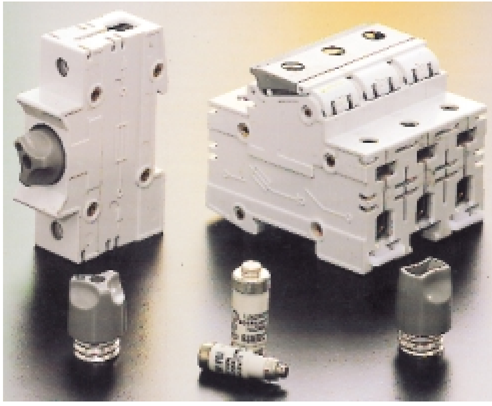


TIME VS. CURRENT CHARACTERISTICS



DO-type (NEOZED)

DO Fuse System



2 – 100 A, ~ 400 (440) V, – 250 V

Line protection fuses - gL-gG
Motor protection fuses - aM

IEC 269-3-1
DIN VDE 0636 Part 41
DIN VDE 0636 Part 301

Germany

Austria

Denmark

Norway

Dimensions are stipulated in the following regulations:

DIN 49522 DO Fuse-links
DIN 49523 DO Gauge rings
DIN 49524 DO Fuse bases

Structure of NEOZED fuse system

The NEOZED system, similar to the D-system, consists of a fuse base, gauge-ring, fuse link and screw cap. It is dimensioned for nominal voltages of ~ 440V ~ 400 V and ~ 250 V. The system guarantees that from 6 A onwards rated current will not be confused from current stage to current stage. This is ensured by staging the diameter of the fuse link's base current in connection with gauge diameters determined accordingly.

DIN Fuses

D0-type (NEOZED)



NEOZED
Fuse-links
2–100 A gL-gG
~400 V, –250 V

Characteristics page 134

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	2	pink	01700.002000	T214676	50
	4	brown	01700.004000	W200809	50
	6	green	01700.006000	B215695	50
	10	red	01700.010000	W211090	50
	13	black	01700.013000*	C201206*	50
	16	grey	01700.016000	R223023	50
D02	20	blue	01701.020000	B217742	50
	25	yellow	01701.025000	W213160	50
	35	black	01701.035000	R219826	50
	50	white	01701.050000	D215191	50
	63	copper	01701.063000	C201873	50
D03	80	silver	01702.080000	L216716	10
	100	red	01702.100000	N212647	10

*No VDE, ÖVE testing mark
Dimensions pages 135,136,137

Rated Current	Back-up fuse in operating class gL-gG: 20 A	25 A	35 A	50 A	63 A	80 A
20 A aM	600	300	200	<100	<100	<100
25 A aM	–	1500	700	100	<100	<100
35 A aM	–	–	1000	300	200	<100



NEOZED
Fuse-links
20–35 A aM
~400 V / 440 V

Characteristics page 134

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D02	20	blue	01701.020500*	H211607*	10
	25	yellow	01701.025500*	F212640*	10
	35	black	01701.035500*	J213655*	10

*No VDE, ÖVE testing mark
Dimensions pages 135,136,137

DIN Fuse Accessories

D0-type (NEOZED)



NEOZED
Screw cap

plastic
~400/440 V



porcelain
~400/440 V

SIZE	RATED In CURRENT (A)	CAP THREAD	CATALOG NUMBER	REFERENCE NUMBER	PACK.
with testing hole					
D01	16	E 14	01714.000200	E212501	20
D02	63	E 18	01715.000200	P211981	20
for D01 fuse links with adapter spring					
D02		E 18	01715.890200	M214026	20
with sealable hole and testing hole					
D01	16	E 14	11714.000220	R214536	20
D02	63	E 18	11715.000220	S214537	20
without testing hole					
D02	63	E 18	01715.000000	L206435	20
with testing hole					
D01	16	E 14	01710.000200	H201211	20
D02	63	E 18	01711.000200	T215044	20
without testing hole					
D03 100	M30 x 2		01712.000200	V215045	20

Dimensions pages 135,136,137

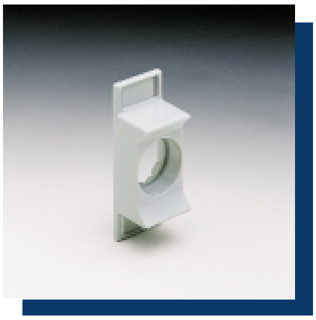


NEOZED
Gauge rings

SIZE	RATED In CURRENT (A)	COLOR CODE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	2	pink	01705.002000	J216576	50
	4	brown	01705.004000	J219681	50
	6	green	01705.006000	P206438	50
	10	red	01705.010000	M213014	50
D02	2	pink	01706.002000*	K216577*	50
	4	brown	01706.004000*	S222127*	50
	6	green	01706.006000*	R211983*	50
	10	red	01706.010000*	H216069*	50
	16	grey	01706.016000*	Q218629*	50
	20	blue	01706.020000	S200668	50
	25	yellow	01706.025000	R213524	50
	35	black	01706.035000	J216070	50
	50	white	01706.050000	R218630	50
D03	80	silver	01707.080000	T200669	25

*For use of D01 fuse-links in D02 fuse-bases
Dimensions pages 135,136,137

D0-type (NEOZED)



NEOZED
Insulating covers
single pole

3-pole

	CATALOG NUMBER	REFERENCE NUMBER	PACK.
for type D01/D02			
with 1-side marking area	01718.008000	M222881	50
with marking area	01718.700000	V200670	50
for type D03			
without marking area	01728.000000	V211986	20
for type D01/D02			
cover - cap	01721.030000	X201730	20
for type D01/D02			
with marking area	01732.700000	M216579	20

Dimensions pages 135,136,137



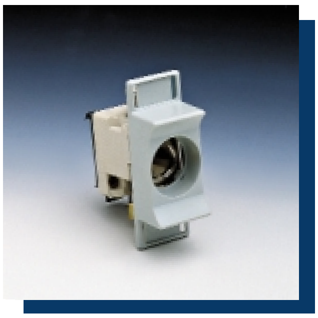
NEOZED
Fuse bases
for screw mounting without shock-proof protection-cover, 400~V



NEOZED
Fuse bases
for snap-on fastening without shock-proof protection-cover, 400~V

SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm^2	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	16	1 (1*)	4	01720.100000	Z216061	20
D02	63	1 (2*)	25	01721.200000	M214532	20
D02	63	1 (4*)	25	01721.400000	F213008	20
D03	100	1 (4*)	50	01722.400000	J213011	10
D01	16	3 (1*)	4	01730.100000	K200661	5
D02	63	3 (2*)	25	01731.200000	F216573	5
D02	63	3 (4*)	25	01731.400000	K206365	5
D01	16	1 (1*)	4	01720.150000	J200660	20
D02	63	1 (2*)	25	01721.250000	J218623	20
D02	63	1 (4*)	25	01721.450000	W215552	20
D03	100	1 (4*)	50	01722.450000	Q214535	10
D01	16	3 (1*)	4	01730.152000	B216063	5
D02	63	3 (2*)	25	01731.252000	Y217601	5
D02	63	3 (4*)	25	01731.452000	M211979	5

*Terminal types page 135
Dimensions pages 135,136,137



without shock-proof protection-cover

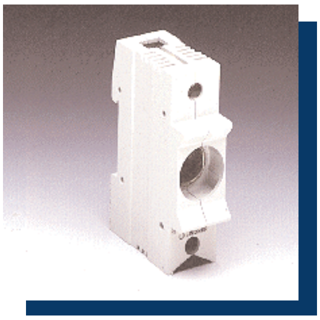
SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm^2	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	16	1 (1*)	4	01720.170000	B211463	20
D01	16	1 (3*)	4	01720.370000	T215550	20
D02	63	1 (2*)	25	01721.270000	M200663	20
D02	63	1 (4*)	25	01721.470000	K218624	20
D03	100	1 (4*)	50	01722.470000	F216067	10
D01	16	3 (1*)	4	01730.172000	A219144	5
D02	63	3 (2*)	25	01731.272000	E222874	5
D02	63	3 (4*)	25	01731.472000	K213518	5

* Terminal types page 135
Dimensions pages 135,136,137

General Purpose Fuses

DIN Fuse Bases

DO-type (NEOZED)



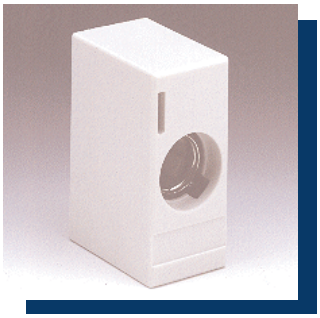
LINOZED
Fuse bases
for snap-on fastening
~400 V



SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	16	1	35	01724.000000	M217085	6
D02	63	1	35	01725.000000	R215042	6
D01	16	3	35	01734.000000	E201208	2
D02	63	3	35	01735.000000	Y215554	2

Dual function terminals

Dimensions pages 135,136,137



NEOZED
Universal fuse bases
for screw mounting,
~400 V

for snap-on fastening

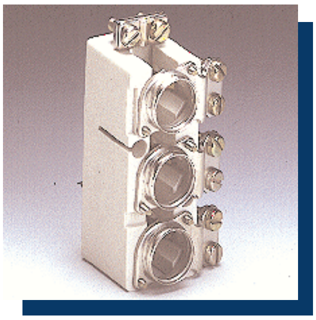
SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	16	1 (1*)	4	01720.130000	B222871	20
D02	63	1 (2*)	25	01721.230000	D216571	20
	63	1 (4*)	25	01721.430000	Q215041	20
D03	100	1 (4*)	50	01722.430000	K214024	10
D01	16	1 (1*)	4	01720.180000	G213515	20
D02	63	1 (2*)	25	01721.280000	L211978	20
D02	63	1 (4*)	25	01721.480000	G213009	20
D03	100	1 (4*)	50	01722.480000	H219680	10

* Terminal types page 135
Dimensions pages 135,136,137

General Purpose Fuses

DIN Fuse Bases

DO-type (NEOZED)



NEOZED
3-pole fuse bases
without shock-proof protection for screw fixing, ~400 V

for snap-on fastening

SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01 D02	16 63	3 (1*) 3 (2*)	4 25	01737.100000 01738.200000	A212497 Z217602	5 5
D01 D02	16 63	3 (1*) 3 (2*)	4 25	01737.150000 01738.250000	E213007 B218110	5 5

* Terminal types page 135
Dimensions pages 135,136,137



NEOZED
Fuse bases
with clamp fixing, ~400 V



NEOZED
Fuse bases
for snap-on fastening, ~400 V

SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
for busbar 12 x 4 … 5 mm, 15 x 4 …5 mm						
D02	63	1 (2*)	25	01746.200801	P222124	20
for busbar 12 x 4 …10 mm, 15 x 4 …10 mm						
D02	63	1 (2*)	25	01741.200001	L218625	20
for busbar 15 x 5 mm						
D02	63	1 (2*)	25	01741.250000	G219679	20

* Terminal types page 135
Dimensions pages 135,136,137

DIN Fuse Bases

DO-type (NEOZED)



NEOZED
Fuse-links
2–63 A gL-gG
~440 V/–250 V
Characteristics page 134

SIZE	RATED In CURRENT (A)	Code colour	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	2	rosa	01700.002400	E218780	50
	4	braun	01700.004400	V219829	50
	6	grün	01700.006400	X223028	50
	10	rot	01700.010400	S201358	50
	16	grau	01700.016400	C211096	50
D02	20	blau	01701.020400	X212126	50
	25	gelb	01701.025400	S213663	50
	35	schwarz	01701.035400	C214684	50
	50	weiß	01701.050400	J215702	50
	63	Kupfer	01701.063400	N216718	50

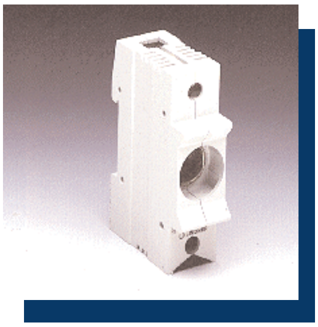
Dimensions pages 135,136,137



NEOZED Fuse bases
for snap-on fastening without shock-proof protection cover,
~440 V

SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01	16	1 (1*)	4	01720.150040	D201207	20
D02	63	1 (2*)	25	01721.250040	M222122	20
D02	63	1 (4*)	25	01721.450040	C216064	20
D01	16	3 (1*)	4	01730.152040	C216570	5
D02	63	3 (2*)	25	01731.252040	A218109	5
D02	63	3 (4*)	25	01731.452040	C212499	5

* Terminal types page 135



LINOZED Fuse bases
for snap-on fastening,
~440 V

Dual function clamps

D01	16	1	35	01724.000040	X217600	6
D02	63	1	35	01725.000040	X215553	6

Dimensions pages 135,136,137



Dual function terminal

D01	16	3	35	01734.000040	P201723	2
D02	63	3	35	01735.000040	E216066	2

Dimensions pages 135,136,137

General Purpose Fuses

DIN Fuse Accessories

D0-type (NEOZED)



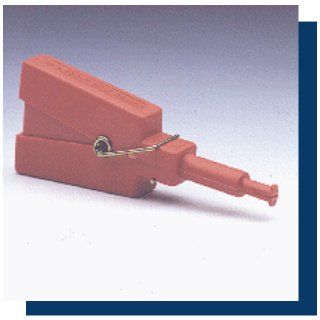
NEOZED
Special holding spring

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01 Fuse-links in D02-socket	01713.000000	Z215049	50
D02 Fuse-links in D03-socket	01709.000000	P214028	10
D01 Fuse-links in DL-socket	01733.000000	J218117	100



NEOZED
Spacer

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D02 Fuse-links in D03-socket	01707.000000	T211985	10



NEOZED
Gauge ring key

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
gauge-rings D01, D02, D03	01708.000000	J212505	10



NEOZED
Screw-cap remover

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
plastic screw-caps D01, D02	01716.000000	X222936	1
	01716.333000	F200726	1



NEOZED
Locking caps

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D01 supply boards [1]	01714.800000*	D212546*	25
D01 Industry [2]	01714.810000	P213062	25
D02 supply boards [1]	01715.800000*	R214582*	25
D02 Industry [2]	01715.810000	Y215094	25

* only for authorized energy supplier personnel
[1] black top, red screw pitch
[2] red top, black screw pitch

Locking keys

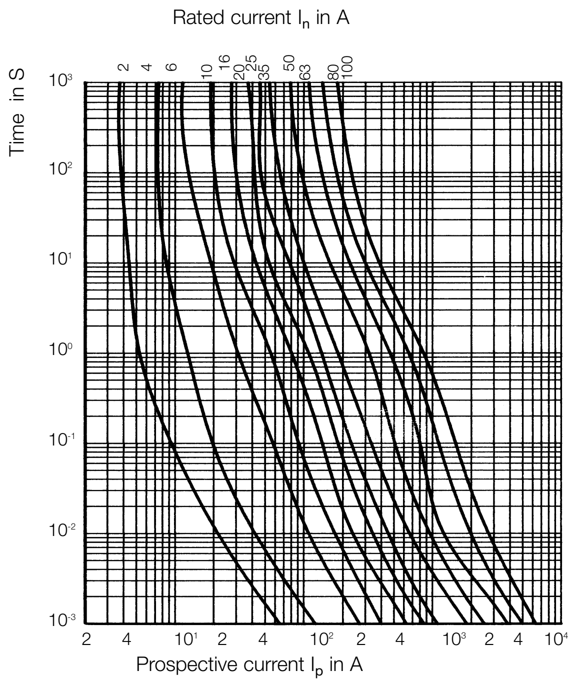
SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D02 Supply boards	01714.820000*	K213564	10
D02 Industry	01714.830000	J214069	10

* for authorized energy supplier personnel only

DO-type (NEOZED)

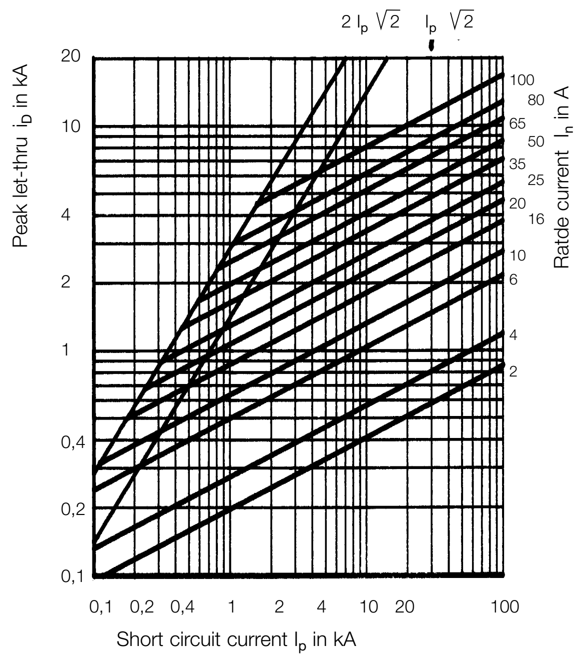
NEOZED Fuse-links - gL-gG

Time vs current characteristics



For NEOZED Fuse-links 2…100 A gL-gG

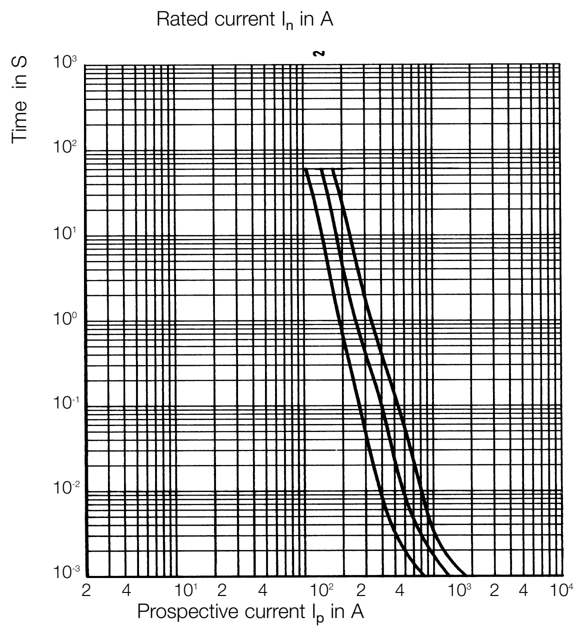
Peak let-thru characteristics



For NEOZED Fuse-links 2…100 A gL-gG

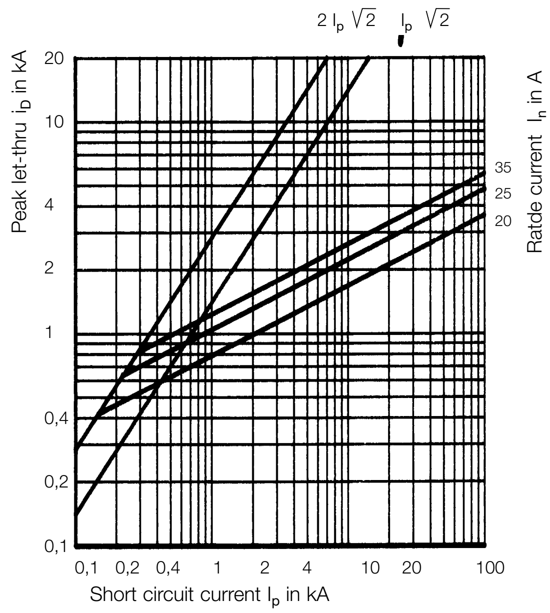
NEOZED Fuse-links - aM

Time vs current characteristics



For NEOZED Fuse-links 2…100 A gL-gG

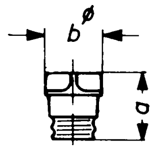
Peak let-thru characteristics



For NEOZED Fuse-links 2…100 A gL-gG

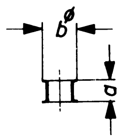
DO-type (NEOZED)

Dimensions



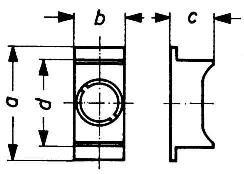
Cat #.	a	b
1714	29,5	23
1715	29,5	23
1710	31	25
1711	31	25
1712	37	40

NEOZED Screw caps



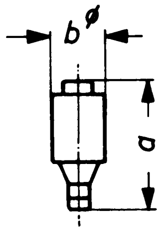
Cat #.	a	b
1705	10	12
1706	10	16
1707	10	27

NEOZED Gauge rings



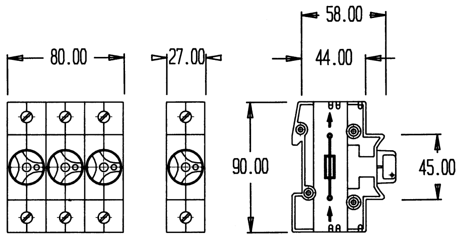
Cat #.	a	b	c
1718.008	60	26,8	23
1728.7	71	26,8	23
1728	60	44	18
1732.7	71	81	23

NEOZED Covers

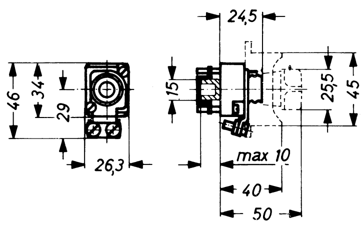


	a_1	bø
D01	36	11
D02	36	15
D03	43	22

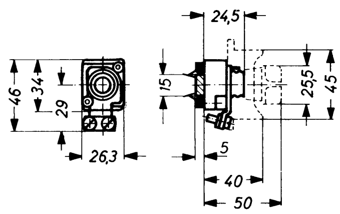
NEOZED Fuse-links



LINOZED Fuse bases

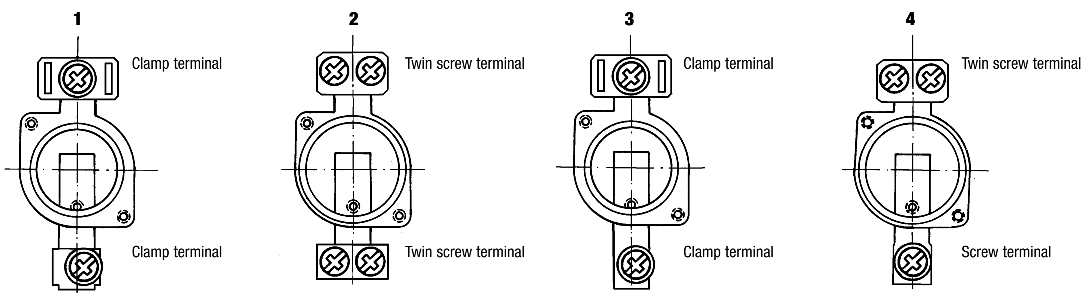


NEOZED Fuse bases for busbars
with clamp fixing , ~400 V



NEOZED Fuse bases for busbars
for snap-on fastening, ~400 V

Terminal types

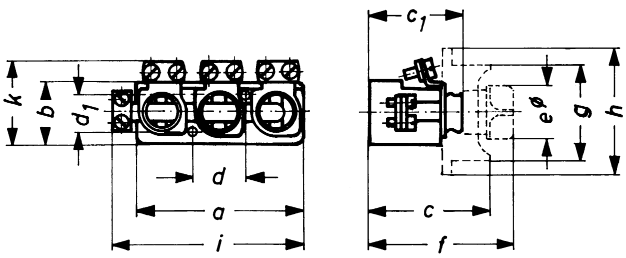


DO-type (NEOZED)

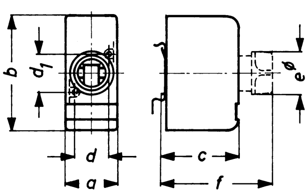
Dimensions

NEOZED Fuse bases

Catalog number	Dimensions in mm a	b	c	c_1	d	d_1	eØ	f	g	h	k
1720.1	26,3	36	–	39,5	20	22	25,5	64	34 ø	–	50,5
1721.2/.4	26,3	36	–	39,5	20	22	25,5	64	34 ø	–	57,5
1722.4	44	50	–	44	32	32	40	74	52 ø	–	86
1730.1	80,5	36	–	39,5	74	22	25,5	64	–	–	50,5
1731.2/.4	80,5	36	–	39,5	74	22	25,5	64	–	–	57,5
1730.12	80,5	36	55	39,5	74	22	25,5	64	45	71	50,5
1731.22/.42	80,5	36	55	39,5	74	22	25,5	64	45	71	57,5
1720.15	26,3	36	–	41,5	20	22	25,5	66	34 ø	–	50,5
1721.25/.45	26,3	36	–	41,5	20	22	25,5	66	34 ø	–	57,5
1722.45	44	50	–	46	32	32	40	76	52 ø	–	86
1720.17	26,8	36	57	41,5	20	22	25,5	66	45	71	50,5
1721.27/.47	26,8	36	57	41,5	20	22	25,5	66	45	71	57,5
1722.47	44	50	54,5	46	32	32	40	76	45	71	86
1730.15	80,5	36	–	41,5	74	22	25,5	66	–	–	50,5
1731.25/.45	80,5	36	–	41,5	74	22	25,5	66	–	–	57,5
1730.17	80,5	36	57	41,5	74	22	25,5	66	45	71	50,5
1731.27/.47	80,5	36	57	41,5	74	22	25,5	66	45	71	57,5



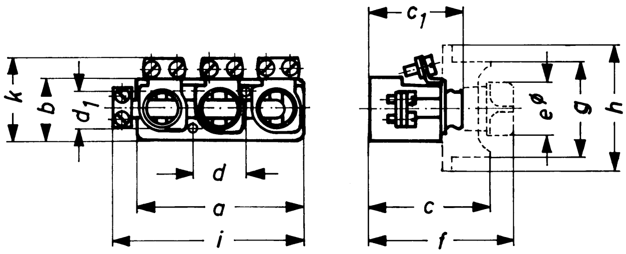
Catalog number	Dimensions in mm a	b	c	d	d_1	eØ	f
1720.13	31	70	44,5	20	22	25,5	64
1721.23, 1721.43	31	70	44,5	20	22	25,5	64
1722.43	50	105	48	32	32	40	74
1720.18	31	70	46,5	20	22	25,5	66
1721.28, 1721.48	31	70	46,5	20	22	25,5	66
1722.48	50	105	50	32	32	40	76



D0-type (NEOZED)

NEOZED Fuse bases

Catalog number	Dimensions in mm											
	a	b	c	c[1]	d	d[1]	eØ	f	g	h	i	k
1737.12	80,5	30	55	39,5	22	20	25,5	64	45	71	88,5	36,5
1738.22	80,5	30	55	39,5	22	20	25,5	64	45	71	91,5	44,5
1737.17	80,5	30	57	41,5	22	20	25,5	66	45	71	88,5	36,5
1738.27	80,5	30	57	41,5	22	20	25,5	66	45	71	91,5	44,5



D-type (DIAZED)

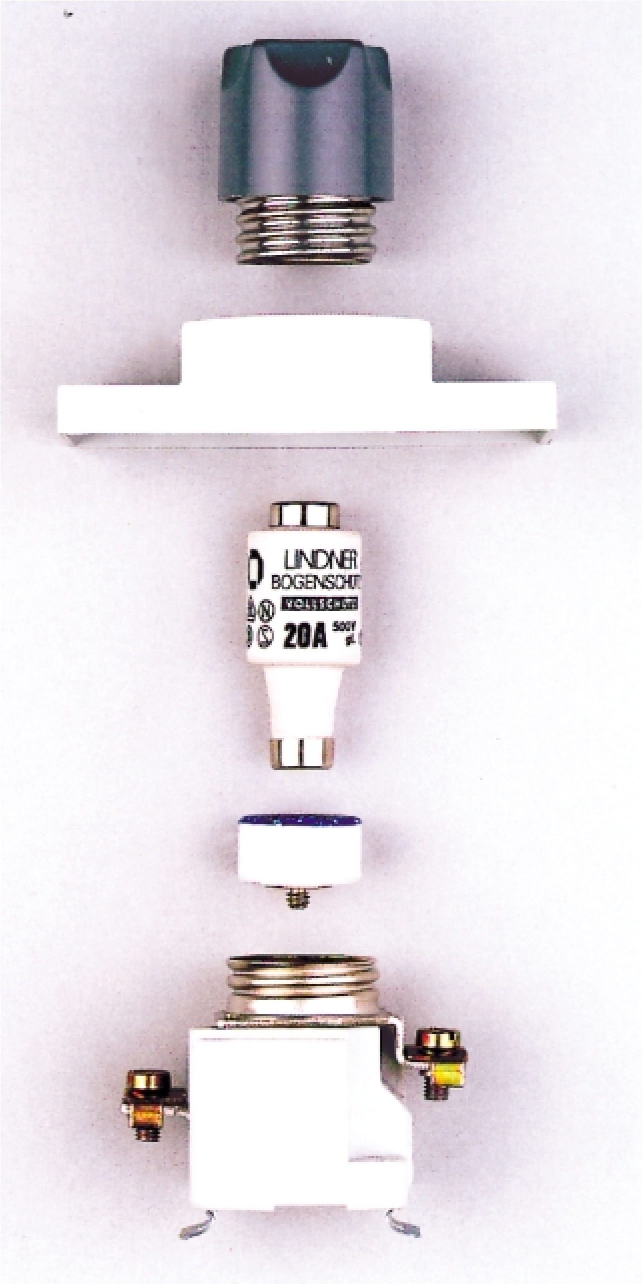
D Fuse System

2 – 200 A, 500 V, 690 V
Line protection fuses gL-gG

IEC 269-3-1
DIN VDE 0636 Part 31
DIN VDE 0636 Part 301

Dimensions are stipulated in the following regulations:

DIN 49360 D Fuse-links
DIN 49515 D Fuse-links
DIN 49367 D Fuse-links, long design
DIN 49514 D Screw caps
DIN 49510 D Fuse bases
DIN 49362 D Gauge rings
DIN 49516 D Screw gauge pieces



Structure of the D fuse system

Like the modern NEOZED system, the D-Fuse system consists of fuse base, gauge piece, fuse link and screw cap. It is designed for a rated voltage of 500V. Non-interchangeability of rated current is guaranteed from one current level to the other above 6 Amps. This is ensured by graduating the diameter of the bottom contact of the fuse-link along with corresponding fixed diameters for the gauge piece.

General Purpose Fuses

DIN Fuse Accessories

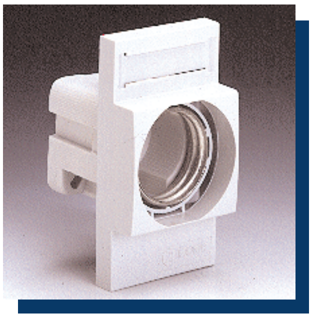
D-type (DIAZED)



D Fuse bases
for snap-on fastening

500 V

SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
without shock-proof protection cover						
DII	25	1*	6	00685.100000	K207055	15
DIII	63	4*	16	00686.400000	V215597	15
with shock-proof protection cover						
DII	25	1	6	00685.110000	D211511	10
DIII	63	4	16	00686.410000	C216110	10



D Fuse bases
for screw fixing

500 V

SIZE	RATED In CURRENT (A)	Pole	Max cross sect. mm²	CATALOG NUMBER	REFERENCE NUMBER	PACK.
without shock-proof protection cover						
DII	25	1*	6	00081.100000	K218670	15
DIII	63	4*	16	00072.400000	H212021	15
with shock-proof protection cover						
DII	25	1*	6	00081.110000	Z219189	10
DIII	63	4*	16	00072.410000	A212543	10

* Terminal types see page 143





D Fuse-links
2 - 200A gL-gG

500 V

Characteristics page 143

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
NDZ	2	pink	00594.002000	C222918	25
NDZ	4	brown	00594.004000	L200708	25
NDZ	6	green	00594.006000	A201250	25
NDZ	10	red	00594.010000	L201766	25
NDZ	16	gray	00594.016000	D207049	25
NDZ	20	blue	00594.020000	B211509	25
NDZ	25	yellow	00594.025000	Y212541	25
DII	2	pink	00597.002000	E213559	25
DII	4	brown	00597.004000	D214064	25
DII	6	green	00597.006000	L214577	25
DII	10/6 f[1]	red	00597.610000	X218152	25
DII	10	red	00597.010000	S215089	25
DII	16	gray	00597.016000	A216108	25
DII	20	blue	00597.020000	J217128	25
DII	25	yellow	00597.025000	P217639	25
DIII	35	Black	00598.035000	J218669	25
DIII	50	white	00598.050000	J222165	25
DIII	63	copper	00598.063000	M200709	25

[1] with base contact stud for 6 A

General Purpose Fuses

DIN Fuse Accessories

D-type (DIAZED)



D Fuse-links

2 -200 A gL-gG
500 V

Characteristics page 143



SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
NDZ	2	pink	00594.002700	W212539	25
NDZ	4	brown	00594.004700	G213055	25
NDZ	6	green	00594.006700	C213557	25
NDZ	10	red	00594.010700	B214062	25
NDZ	16	grey	00594.016700	J214575	25
NDZ	20	blue	00594.020700	Q215087	25
NDZ	25	yellow	00594.025700	Q215593	25
D II	2	pink	00597.002700	Z219718	25
D II	4	brown	00597.004700	G222163	25
D II	6	green	00597.006700	B222917	25
D II	10/6 f[1]	red	00597.610700	D213558	25
D II	10	red	00597.010700	K200707	25
D II	16	grey	00597.016700	K201765	25
D II	20	blue	00597.020700	A211508	25
D II	25	yellow	00597.025700	X212540	25

[1] with base contact stud for 6 A (without VDE test mark)

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D III	35	black	00598.035700	C214063	25
D III	50	white	00598.050700	K214576	25
D III	63	copper	00598.063700	R215088	25
D IV	80	silver	00595.080700	V216609	10
D IV	100	red	00595.100700	M217637	10
D V	125	yellow	00596.125700	V218150	10
D V	160	copper	00596.160700	G218667	10
D V	200	blue	00596.200700	W219186	10

D Fuse system ~ 690 V

In this design, the fuse base and gauge piece correspond to the 500 V standard for D III (E33). The extended fuse links D III and a special extended screw cap serve to complement the present system. D-type 690 V fuses are only available in size III.



D Fuse-links

2 - 63 A gL - gG
~ 690 V

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D III	2	pink	00603.002700	R215594	25
D III	4	brown	00603.004700	Z216107	25
D III	6	green	00603.006700	W216610	25
D III	10	red	00603.010700	H217127	25
D III	16	grey	00603.016700	N217638	25
D III	20	blue	00603.020700	W218151	25
D III	25	yellow	00603.025700	H218668	25
D III	35	black	00603.035700	X219187	25
D III	50	white	00603.050700	A219719	25
D III	63	copper	00603.063700	H222164	25



D Screw-cap
long design

~ 690 V

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D III	63		00605.000000	L218671	25

Dimensions page 143

General Purpose Fuses

DIN Fuse Accessories

D-type (DIAZED)



D Screw caps

Porcelain

500 V



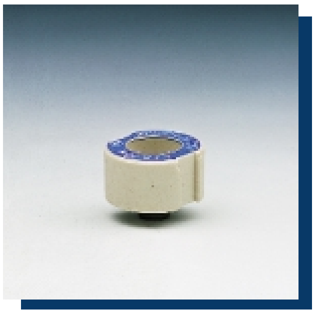
Plastic

500 V

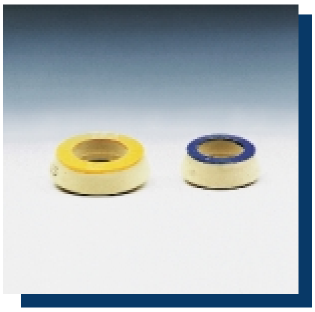
SIZE	RATED In CURRENT (A)		CATALOG NUMBER	REFERENCE NUMBER	PACK.
Porcelain – with testing hole					
DII	25	E 27	00690.000200	E218619	20
DIII	63	E 33	00691.000200	B213004	20
Porcelain – without testing hole					
NDZ	25	E 16	00589.000000	Z216613	50
DII	25	E 27	00690.000000	Z218108	20
DIII	63	E 33	00691.000000	F211973	20
DIV	100	R1 1/4	00592.000000	Y216060	10
Plastic – with testing hole					
DII	25	E 27	02071.000000	L201720	20
DII	63	E 33	02072.000000	E214019	20



D Gauge piece



D Screw gauge pieces



D Gauge rings

SIZE	RATED In CURRENT (A)	GAUGE COLOR	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D Gauge piece					
NDZ	2	pink	01655.002000	B212544	50
NDZ	4	brown	01655.004000	M213060	50
NDZ	6	green	01655.006000	H213562	50
NDZ	10	red	01655.010000	G214067	50
NDZ	16	grey	01655.016000	P214580	50
D Screw gauge pieces					
D II	2	pink	01657.002000	A219190	25
D II	4	brown	01657.004000	D219722	25
D II	6	green	01657.006000	L222167	25
D II	10	red	01657.010000	F222921	25
D II	16	grey	01657.016000	P200711	25
D II	20	blue	01657.020000	D201253	25
D II	25	yellow	01657.025000	P201769	25
D III	35	black	01658.035000	C207071	25
D III	50	white	01658.050000	E211512	25
D III	63	copper	01658.063000	J212022	25
D Gauge rings					
D II	2	pink	01652.002000	W215092	50
D II	4	brown	01652.004000	W215598	50
D II	6	green	01652.006000	D216111	50
D II	10	red	01652.010000	A216614	50
D II	16	grey	01652.016000	M217131	50
D II	20	blue	01652.020000	S217642	50
D II	25	yellow	01652.025000	A218155	50
D III	2	pink	01653.002000	M218672	50
D III	4	brown	01653.004000	E219723	50
D III	6	green	01653.006000	M222168	50
D III	10	red	01653.010000	G222922	50
D III	16	grey	01653.016000	Q200712	50
D III	20	blue	01653.020000	E201254	50
D III	25	yellow	01653.025000	Q201770	50
D III	35	black	01653.035000	L207079	50
D III	50	white	01653.050000	F211513	50

Dimensions page 143

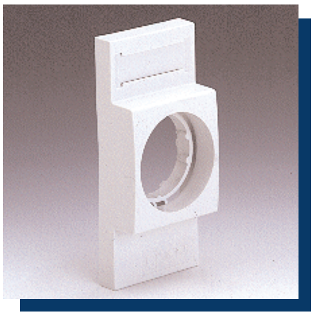
DIN Fuse Accessories

D-type (DIAZED)



Key for D gauge pieces

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
DII, DIII	01657.993000	E216112	10



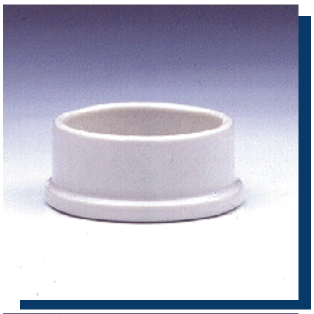
D Covers
insulating material

single pole

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D II	00685.700000	H214068	30
D III	00686.700000	X215093	30
D II	00685.709000	Q214581	30
D III	00686.709000	X215599	30

triple pole

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D II	00625.700000	N213061	8
D II	00626.700000	J213563	8



D Contact protection rings

Plastic

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D II	00181.900000	K222120	50
D III	00182.900000	A222870	50

Porcelain

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D II	00081.900000	C219675	30
D III	00072.900000	K212023	20



D Adapter fittings

for DII-fuses links in D III-bases

SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
D II/ D III	00581.000000	C212545	50

D Spacer



D Locking caps

SIZE		CATALOG NUMBER	REFERENCE NUMBER	PACK.
DII	Supply boards[1)]	02071.800000*	B216615*	10
DII	Industry[2]	02071.810000	N217132	10
DIII	Supply boards[1)]	02072.800000*	T217643*	10
DIII	Industry[2)]	02072.810000	B218156	10

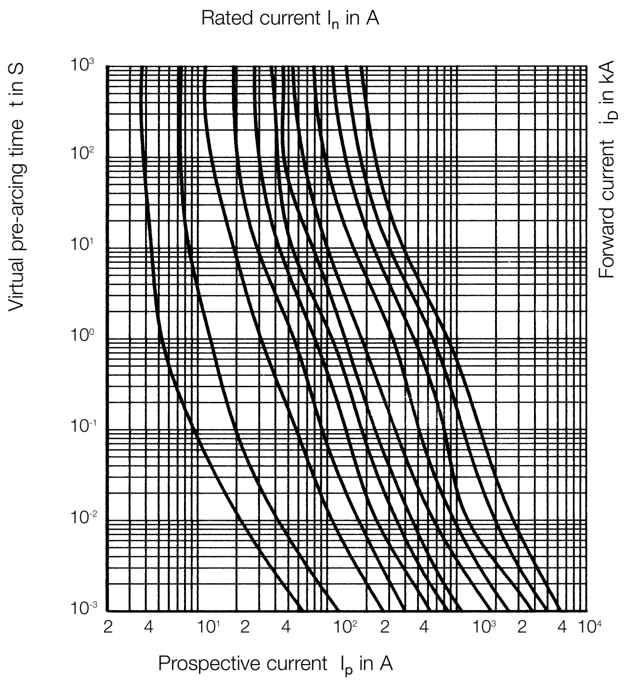
* For authorized energy supplier personnel only
[1)] black top, red screw pitch
[2)] red top, black screw pitch

Locking keys

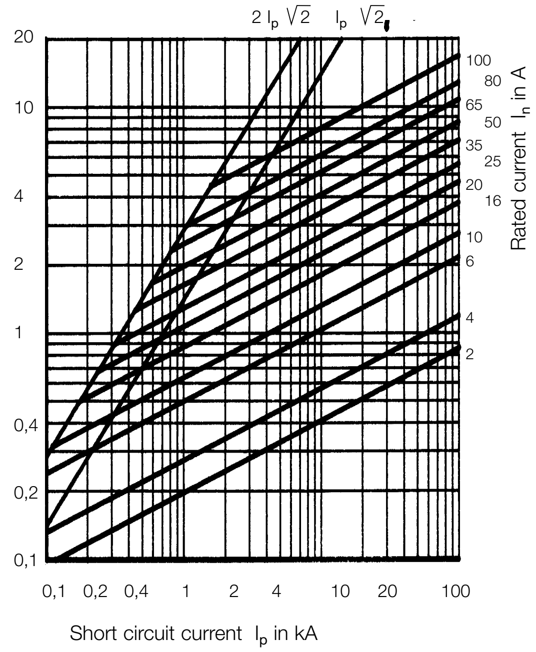
SIZE	CATALOG NUMBER	REFERENCE NUMBER	PACK.
Supply boards	01714.820000*	K213564*	10
Industry	01714.830000	J214069	10

*For authorized energy supplier personnel only

D-type (DIAZED)

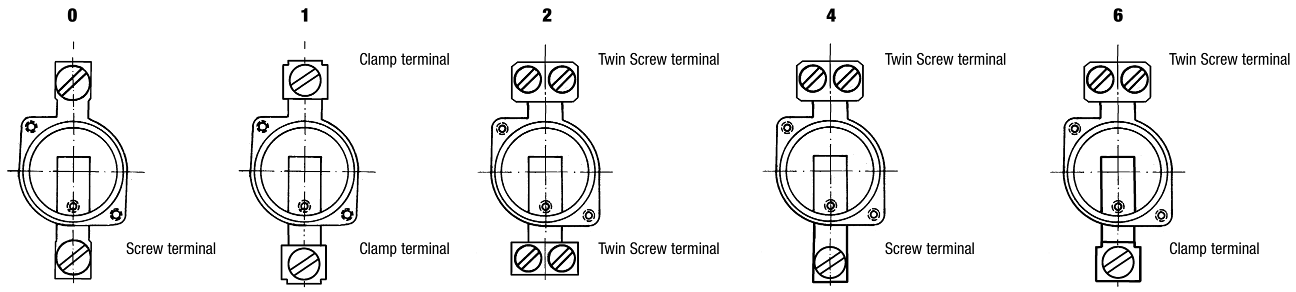


Time-current characteristics of D Fuses 2…100 A gL-gG

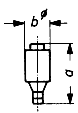


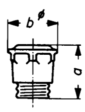
Forward current characteristics of NEOZED fuses 2…100 A gL-gG

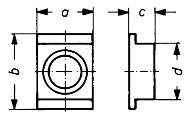
Terminal types

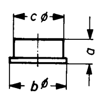


Dimensions









D Fuse-links

Cat #	a_1	bØ
NDZ	50	12
DII	50	22
DIII	50	27
DIV	63	37
DV	65	45

D Screw caps

Cat. #	a	b
690.0002	42	34
691.0002	43	42
589.0002	34	27
690	42	34
691	43	42
592	52	60
2071	42	33
2072	43	40

D Covers

Cat. #	a	b	c
685.7	40	90	22
686.7	50	90	22
685.709	45	90	22
686.709	54	90	22
625.7	107	107	51
626.7	127	130	51

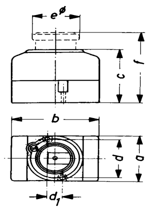
D Contact protection rings

Cat. #	a	b	c
181.9	17,5	44,5	40,5
182.9	19	54	50,5
81.9	18,5	43,5	39,8
72.9	18	53,5	50,5

D-type (DIAZED)

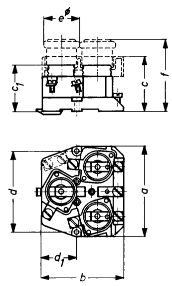
Dimensions

Catalog number	Sizes in mm						
	a	b	c	d	d_1	eØ	f
99	40	70	53	32	–	38	82
199	40	70	54	20	–	38	83
200	50	90	54	20	–	48	83

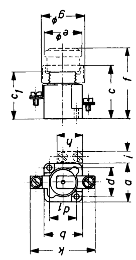


Catalog number	Sizes in mm							
	a	b	c	c_1	d	d_1	eØ	f
625	90	81	54.5	46	80	35	37	81
626	109	100	54.5	46	95	49.5	46.5	81
625*	107	107	51	–	–	–	–	–
626*	127	130	51	–	–	–	–	–

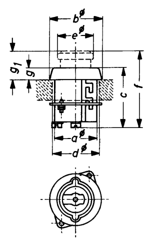
* with cover cap



Catalog number	Sizes in mm										
	a	b	c	c_1	d	d_1	eØ	f	Ø	h	i	k
685/81	38	40	60	46	29	27	38	82	43	–	–	60
686/72	46	44	57	48	35	33,5	48	84	52	–	–	73



Catalog number	Sizes in mm							
	a	b	c	d	e	f	g	g_1
120	42	52	60	44	38	85	12	37
121	52	62	63	54	48	88	13	38



Miniature Fuses

UL Fuses

Glass body / Ceramic tube

IEC Fuses

Subminiature

5SF 5x20

5ST 5x20

3SF 6x32

5HF 5x20

5HT 5x20

Semiconductor Fuses

5x20

6x32

Axial Leads - Reeled Tape Fuses

Fuses with Striker

Fuse Sets

Miniature Fuses

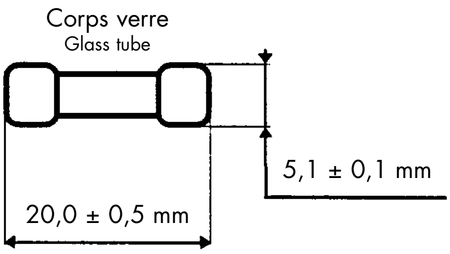
UL Fuses

Glass body / Ceramic body 5MF 5x20

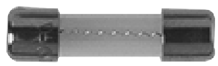
Conforme aux normes UL 198-G et CSA 22-2
Complying with UL 198-G and CSA 22-2

250 V / 125 V ~
5MF RAPIDES (FAST BLOW)
DE (FROM) 0.08 A (TO) 8 A
TAILLE (SIZE): 5 x 20

Dimensions
Dimensions



Poids maximum : 1,2 g
Max weight: 1,2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

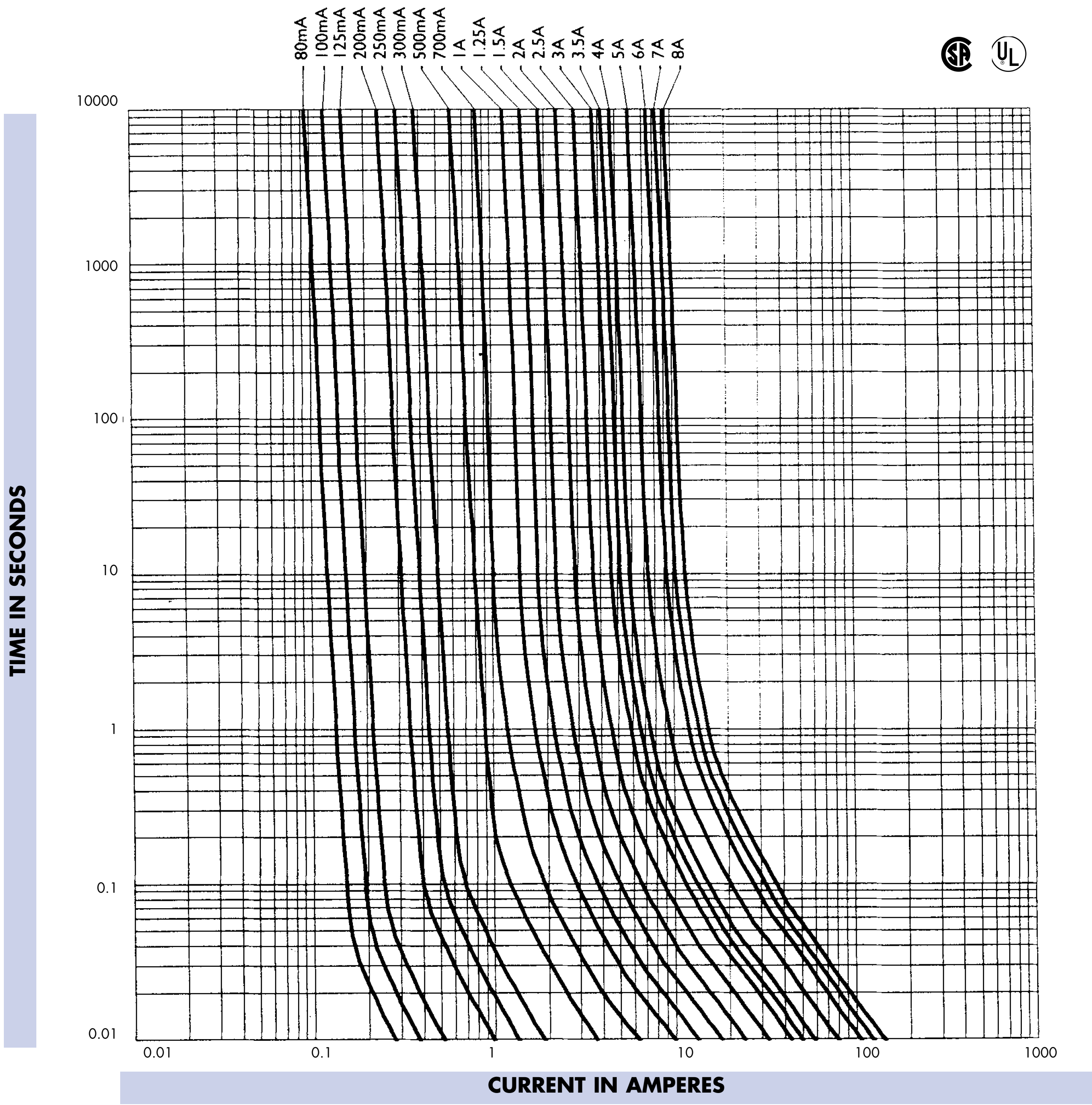
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References blister of
mm	V	A	A	A	V	V		1 000	50
5 x 20	250	0,08	200	10 000	1,7	3,05	250V 5MF 0,08 A 5 x 20	Q208601T	Q208601P
		0,100			1,5	2,65	250V 5MF 0,100 A 5 x 20	F207511T	F207511P
		0,125			1,8	3,64	250V 5MF 0,125 A 5 x 20	G207512T	G207512P
		0,200			1,4	2,76	250V 5MF 0,200 A 5 x 20	H207513T	H207513P
		0,250			1,3	2,40	250V 5MF 0,250 A 5 x 20	J207514T	J207514P
		0,300			1,1	2,09	250V 5MF 0,300 A 5 x 20	K207515T	K207515P
		0,400					250V 5MF 0,400 A 5 x 20	L207516T	L207516P
		0,500			0,9	1,58	250V 5MF 0,500 A 5 x 20	V206236T	V206236P
		0,600			0,9	1,58	250V 5MF 0,600 A 5 x 20	W206237T	W206237P
		0,700			0,13	0,22	250V 5MF 0,700 A 5 x 20	M207517T	M207517P
		0,750			0,13	0,22	250V 5MF 0,750 A 5 x 20	X206238T	X206238P
		0,800			0,13	0,22	250V 5MF 0,800 A 5 x 20	N207518T	N207518P
		1,000			0,12	0,2	250V 5MF 1 A 5 x 20	Y206239T	Y206239P
		1,250			0,12	0,19	250V 5MF 1,25 A 5 x 20	Z206240T	Z206240P
		1,500			0,11	0,18	250V 5MF 1,5 A 5 x 20	A206241T	A206241P
		1,600			0,11	0,18	250V 5MF 1,6 A 5 x 20	P207519T	P207519P
		2,000			0,1	0,17	250V 5MF 2 A 5 x 20	B206242T	B206242P
		2,500			0,1	0,16	250V 5MF 2,5 A 5 x 20	C206243T	C206243P
		3,000			0,9	0,15	250V 5MF 3 A 5 x 20	D206244T	D206244P
5 x 20	125	4,000	—	10 000	0,9	0,14	125V 5MF 4 A 5 x 20	E206245T	E206245P
		5,000			0,8	0,13	125V 5MF 5 A 5 x 20	F206246T	F206246P
		6,000			0,7	0,12	125V 5MF 6 A 5 x 20	G206247T	G206247P
		7,000			0,7	0,12	125V 5MF 7 A 5 x 20	H206248T	H206248P
		8,000			0,7	0,12	125V 5MF 8 A 5 x 20	J206249T	J206249P

Glass body / Ceramic body 5MF 5x20

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	100 % x In	135 % x In	200% x In
0,1 -> 8 A	4 h mini	1 h maxi	5 s maxi

Caractéristiques temps courant
Time-current characteristics



Ferraz Shawmut

Miniature Fuses

UL Fuses

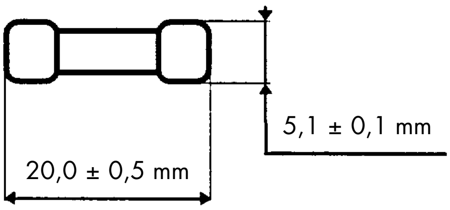
Glass body / Ceramic body 5TT 5x20

Conforme aux normes UL 198-G et CSA C22-2
Complying with UL 198-G et CSA C22-2

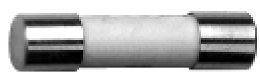
250 V / 125 V ~
5TT TEMPORISES (SLOW BLOW)
DE (FROM) 0.08 A (TO) 10 A
TAILLE (SIZE): 5 x 20

Dimensions
Dimensions

Corps verre ≤ 5A. Corps céramique 6A
Glass tube ≤ 5A. Ceramic tube 6A



Poids maximum : 1,2 g
Max weight: 1.2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References blister of
mm	V	A	A	A	V	V		1 000 pièces	50 pièces
5 x 20	250	0,080	200	10 000	—	—	250V 5TT 0,080 A 5 x 20	N207564T	N207564P
		0,100			1,8	2,8	250V 5TT 0,100 A 5 x 20	P207565T	P207565P
		0,125			1,5	2,3	250V 5TT 0,125 A 5 x 20	Q207566T	Q207566P
		0,200			1,1	1,7	250V 5TT 0,200 A 5 x 20	R207567T	R207567P
		0,250			0,95	1,4	250V 5TT 0,250 A 5 x 20	S207568T	S207568P
		0,300			0,8	1,2	250V 5TT 0,300 A 5 x 20	T207569T	T207569P
		0,400			0,68	1,0	250V 5TT 0,400 A 5 x 20	V207570T	V207570P
		0,500			0,58	0,86	250V 5TT 0,500 A 5 x 20	W207571T	W207571P
		0,600			—	—	250V 5TT 0,600 A 5 x 20	X207572T	X207572P
		0,700			—	—	250V 5TT 0,700 A 5 x 20	Y207573T	Y207573P
		0,750			0,43	0,64	250V 5TT 0,750 A 5 x 20	Z207574T	Z207574P
		0,800			—	—	250V 5TT 0,800 A 5 x 20	A207575T	A207575P
		1,000			0,36	0,52	250V 5TT 1 A 5 x 20	B207576T	B207576P
		1,250			0,3	0,44	250V 5TT 1,25 A 5 x 20	C207577T	C207577P
		1,500			—	—	250V 5TT 1,5 A 5 x 20	D207578T	D207578P
		1,600			0,26	0,37	250V 5TT 1,6 A 5 x 20	E207579T	E207579P
		2,000			0,22	0,32	250V 5TT 2 A 5 x 20	F207580T	F207580P
		2,500			0,19	0,27	250V 5TT 2,5 A 5 x 20	G207581T	G207581P
		3,000			0,16	0,23	250V 5TT 3 A 5 x 20	H207582T	H207582P
5 x 20	125	4,000	—	10 000	0,13	0,19	125V 5TT 4 A 5 x 20	J207606T	J207606P
		5,000			0,11	0,16	125V 5TT 5 A 5 x 20	K207607T	K207607P
		6,000			0,08	0,12	125V 5TT 6 A 5 x 20	L207608T	L207608P
		7,000			—	—	125V 5TT 7 A 5 x 20	M207609T	M207609P
		8,000			0,07	0,10	125V 5TT 8 A 5 x 20	N207610T	N207610P
		10,000			0,06	0,09	125V 5TT 10 A 5 x 20	F208937T	F208937P

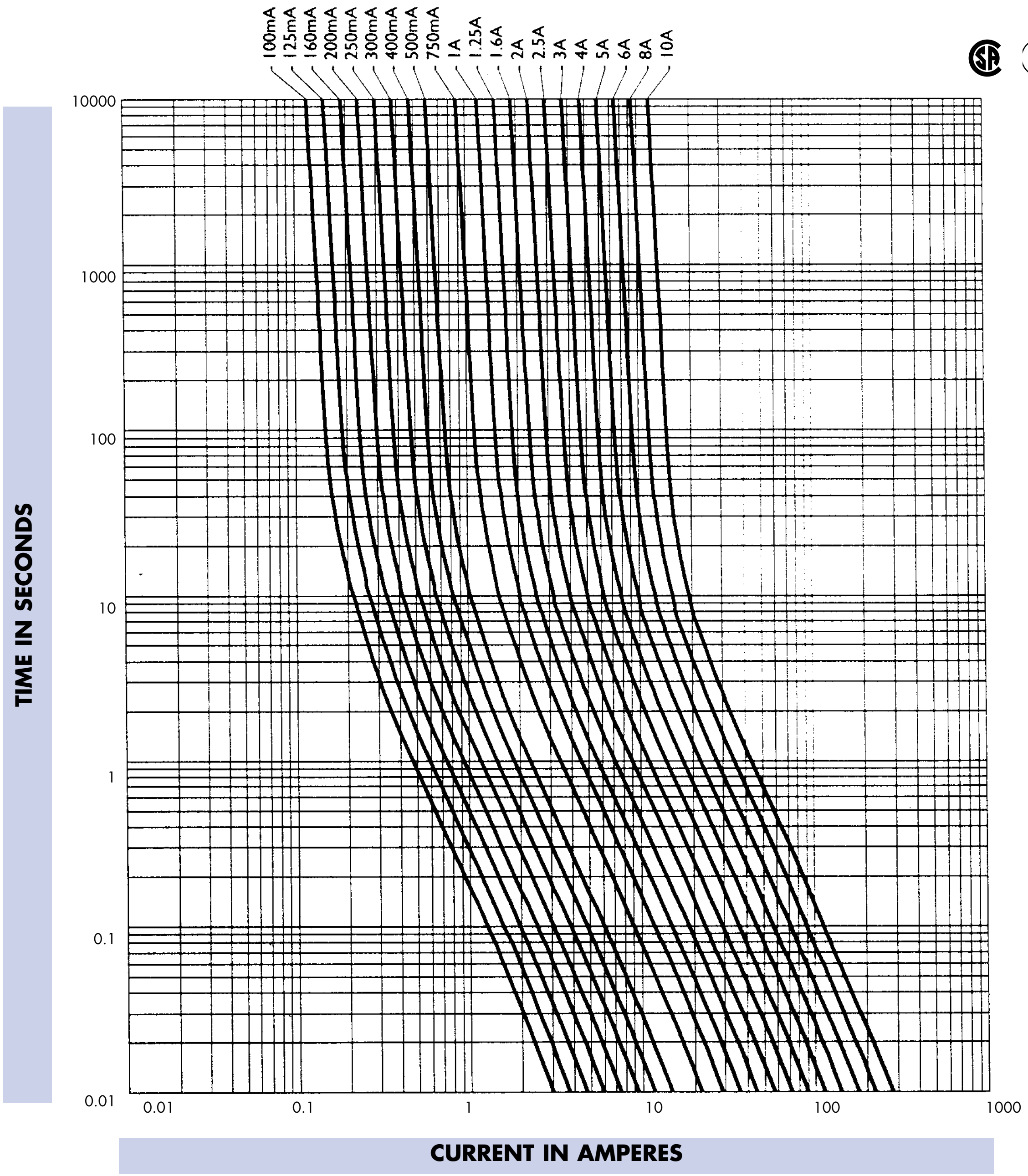
UL Fuses

Glass body / Ceramic body 5TT 5x20

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	100 % x In	135 % x In	200% x In	
0,08 -> 3 A	4 h mini	1 h maxi	5s mini	30s maxi
4 A -> 8 A	4h mini	1 h maxi	3s mini	30s maxi

Caractéristiques temps courant
Time-current characteristics



Miniature Fuses

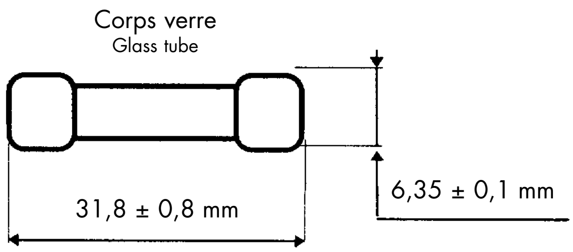
UL Fuses

Glass body / Ceramic body — 3AG 6x32

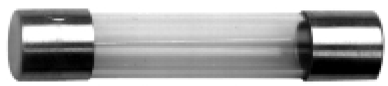
Conforme aux normes UL 198-G et CSA C22-2
Complying with UL 198-G et CSA C22-2

250 V / 125 V ~
3AG RAPIDES (NORMAL BLOW)
DE (FROM) 0,1 A (TO) 15 A
TAILLE (SIZE): 6 x 32

Dimensions
Dimensions



Poids maximum : 2,1 g
Max weight: 2,1 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References blister of
mm	V	A	A	A	V	V		1 000	50
6 x 32	250	0,100	200	10 000	1,5	4,5	250V 3AG 0,100 A 6 x 32	D085701T	D085701P
		0,125			1,8	4,5	250V 3AG 0,125 A 6 x 32	E085702T	E085702P
		0,150			1,8	4,3	250V 3AG 0,150 A 6 x 32	F085703T	F085703P
		0,175			1,7	4,1	250V 3AG 0,175 A 6 x 32	G085704T	G085704P
		0,200			1,66	3,9	250V 3AG 0,200 A 6 x 32	H085705T	H085705P
		0,250			1,6	3,6	250V 3AG 0,250 A 6 x 32	J085706T	J085706P
		0,300			1,5	3,4	250V 3AG 0,300 A 6 x 32	K085707T	K085707P
		0,375			1,4	3,2	250V 3AG 0,375 A 6 x 32	L085708T	L085708P
		0,500			1,4	2,9	250V 3AG 0,500 A 6 x 32	M085709T	M085709P
		0,600			0,18	0,21	250V 3AG 0,600 A 6 x 32	N085710T	N085710P
		0,750			0,17	0,24	250V 3AG 0,750 A 6 x 32	P085711T	P085711P
		1,000			0,15	0,23	250V 3AG 1,000 A 6 x 32	Q085712T	Q085712P
		1,250			0,14	0,21	250V 3AG 1,250 A 6 x 32	R085713T	R085713P
		1,500			0,13	0,2	250V 3AG 1,500 A 6 x 32	S085714T	S085714P
		2,000			0,12	0,18	250V 3AG 2,000 A 6 x 32	T085715T	T085715P
		2,500			0,12	0,17	250V 3AG 2,500 A 6 x 32	V085716T	V085716P
		3,000			0,11	0,162	250V 3AG 3,000 A 6 x 32	W085717T	W085717P
		4,000			0,11	0,154	250V 3AG 4,000 A 6 x 32	X085718T	X085718P
		5,000			0,1	0,146	250V 3AG 5,000 A 6 x 32	Y085719T	Y085719P
		6,000			0,1	0,139	250V 3AG 6,000 A 6 x 32	Z085720T	Z085720P
		7,000			0,09	0,135	250V 3AG 7,000 A 6 x 32	A085721T	A085721P
		8,000			0,09	0,132	250V 3AG 8,000 A 6 x 32	B085722T	B085722P
		10,000			0,08	0,125	250V 3AG 10,00 A 6 x 32	C085723T	C085723P
	125	12,000		10 000	0,08	0,12	125V 3AG 12,00 A 6 x 32	D207509T	D207509P
	125	15,000		10 000	0,08	0,114	125V 3AG 15,00 A 6 x 32	E207510T	E207510P

UL Fuses

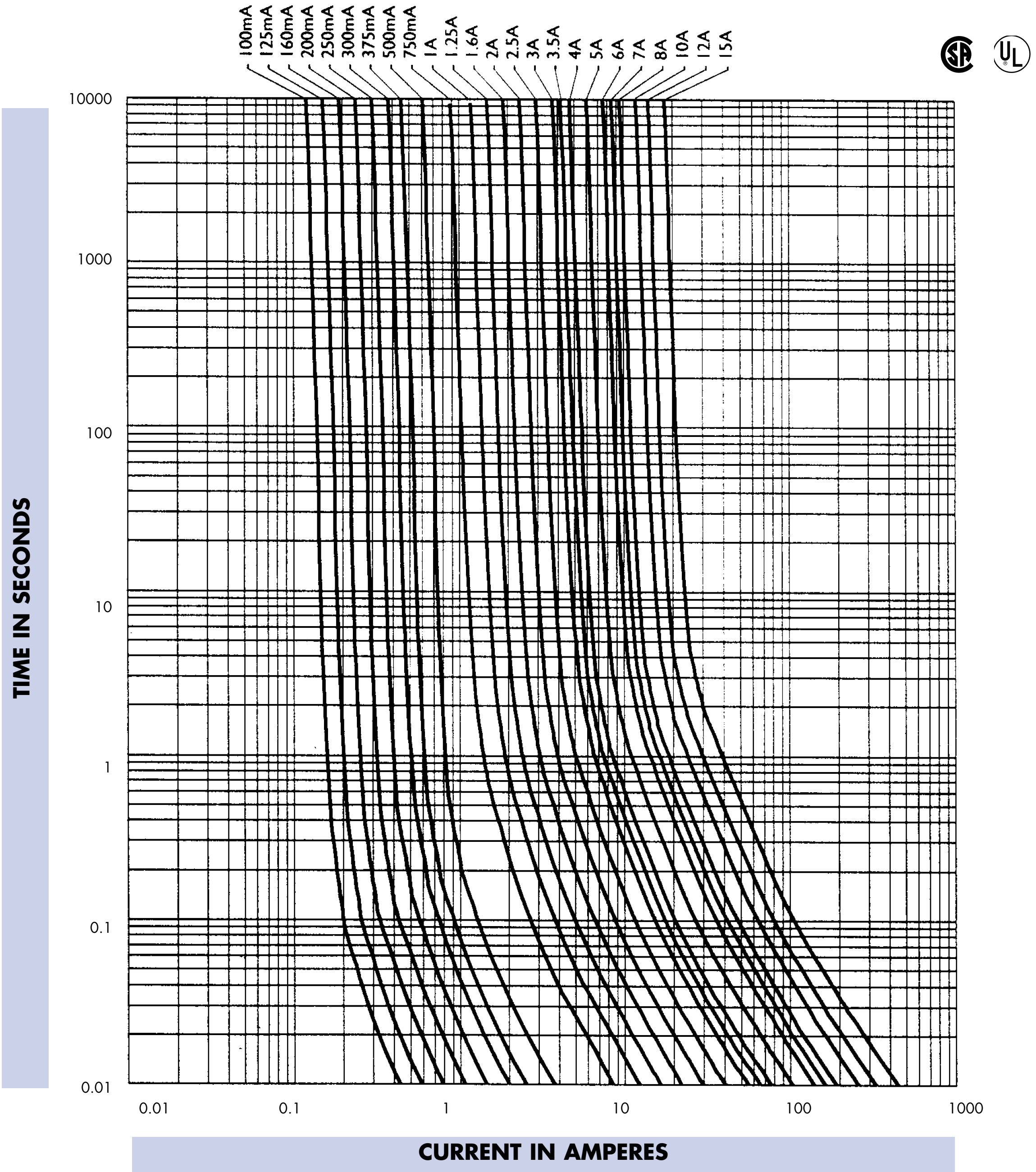
Glass body / Ceramic body

3AG 6x32

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	100 % x In	135 % x In	200% x In
0,1 -> 15 A	4 h mini	1 h maxi	5 s maxi

Caractéristiques temps courant
Time-current characteristics



Ferraz Shawmut

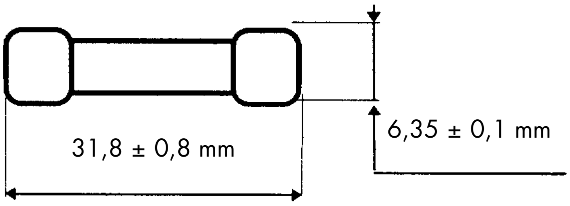
Glass body / Ceramic body — 3SB 6x32

Conforme aux normes UL 198-G et CSA 22-2
Complying with UL 198-G and CSA 22-2

250 V ~
3SB TEMPORISES (SLOW BLOW)
DE (FROM) 0,062 A (TO) 15 A
TAILLE (SIZE): 6 x 32

Dimensions
Dimensions

Corps verre
Glass tube



31,8 ± 0,8 mm

6,35 ± 0,1 mm

Poids maximum : 2,2 g
Max weight: 2.2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

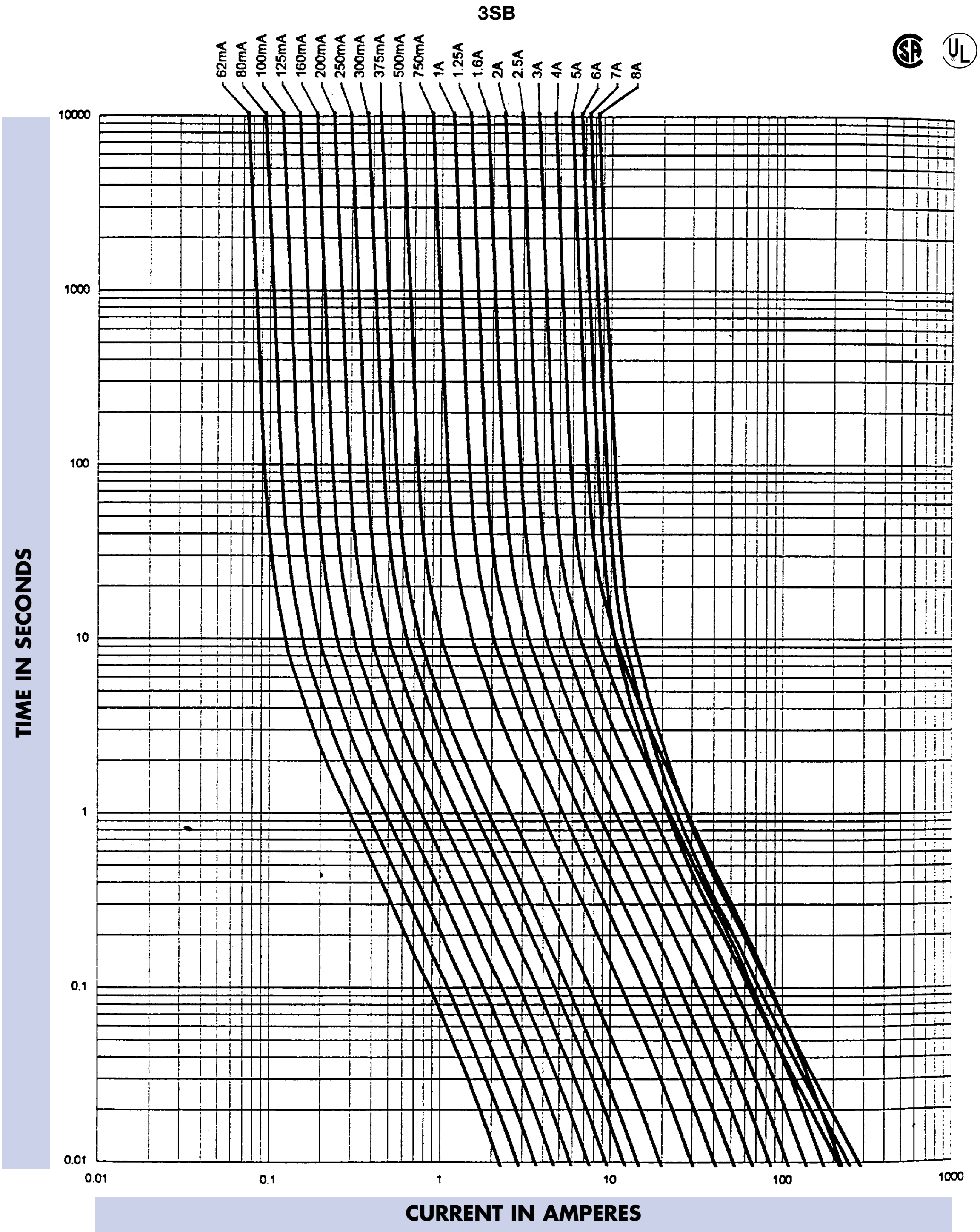
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of 1 000	Référence en blister de References blister of 50
mm	V	A	A	A	V	V		1 000	50
6 x 32	250	0,062	200	10 000	4,6	6,9	250V 3SB 0,062 A 6 x 32	B207507T	B207507P
		0,08			4,05	5,7	250V 3SB 0,08 A 6 x 32	C207508T	C207508P
		0,1			3	4,5	250V 3SB 0,1 A 6 x 32	D085724T	D085724P
		0,125			2,624	4,136	250V 3SB 0,125 A 6 x 32	E085725T	E085725P
		0,15			2,477	3,502	250V 3SB 0,15 A 6 x 32	F085726T	F085726P
		0,175			2,196	3,15	250V 3SB 0,175 A 6 x 32	G085727T	G085727P
		0,2			1,9	2,808	250V 3SB 0,2 A 6 x 32	H085728T	H085728P
		0,25			1,51	2,334	250V 3SB 0,25 A 6 x 32	J085729T	J085729P
		0,3			1,248	1,95	250V 3SB 0,3 A 6 x 32	K085730T	K085730P
		0,375			1,04	1,80	250V 3SB 0,375 A 6 x 32	V087510T	V087510P
		0,4			1,02	1,38	250V 3SB 0,4 A 6 x 32	X087512T	X087512P
		0,5			0,932	1,125	250V 3SB 0,5 A 6 x 32	Y 087513T	Y 087513P
		0,6			0,729	1,08	250V 3SB 0,6 A 6 x 32	Z087514T	Z087514P
		0,75			0,612	0,931	250V 3SB 0,75 A 6 x 32	A087515T	A087515P
		1			0,525	0,75	250V 3SB 1 A 6 x 32	B087516T	B087516P
		1,25			0,368	0,537	250V 3SB 1,25 A 6 x 32	C087517T	C087517P
		1,5			0,344	0,531	250V 3SB 1,5 A 6 x 32	D087518T	D087518P
		1,8			0,314	0,435	250V 3SB 1,8 A 6 x 32	E087519T	E087519P
		2			0,3	0,427	250V 3SB 2 A 6 x 32	F087520T	F087520P
		2,5			0,251	0,359	250V 3SB 2,5 A 6 x 32	G087521T	G087521P
		3			0,24	0,325	250V 3SB 3 A 6 x 32	H087522T	H087522P
		4			0,198	0,286	250V 3SB 4 A 6 x 32	J087523T	J087523P
		5			0,181	0,27	250V 3SB 5 A 6 x 32	K087524T	K087524P
		6			0,132	0,211	250V 3SB 6 A 6 x 32	L087525T	L087525P
		7			0,112	0,156	250V 3SB 7 A 6 x 32	M087526T	M087526P
		8			0,1	0,14	250V 3SB 8 A 6 x 32	Q087529T	Q087529P
6 x 32	125	10	-	10 000	-	0,01	250V 3SB 10 A 6 x 32	Y207619T	Y207619P
		12			-	0,008	250V 3SB 12 A 6 x 32	Z207620T	Z207620P
		15			-	0,006	250V 3SB 15 A 6 x 32	A207621T	A207621P

Glass body / Ceramic body **3SB 6x32**

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	100 % x In	135 % x In	200% x In	
0,062 -> 15 A	4 h mini	1 h maxi	5 s mini	30 s maxi

Caractéristiques temps courant
Time-current characteristics



Miniature Fuses

UL Fuses

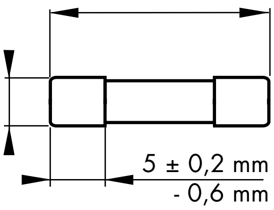
Glass body / Ceramic body — SU 5x20

Conforme aux normes UL 198-G et CSA 22-2
Complying with UL 198-G and CSA 22-2
Homologations UL Listed E 90660 - CSA certified LR 49184.3
Approvals: UL Listed E 90660 - CSA certified LR 49184.3

250 V ~
SEMI-TEMPORISÉS (MEDIUM TIME LAG)
DE (FROM) 1,25 A (TO) 12,5 A
TAILLE (SIZE): 5 x 20

Dimensions
Dimensions

Corps verre
Glass tube



Poids maximum : 1,5 g
Max weight: 1.5 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	Chute maxi de tension à : Max voltage drop at	Désignation Designation	Référence en boîte de 50 pièces References in box of 50 pieces
mm	V	A	A	V à		
5 x 20	250	1,25	10 000 Cos φ 0,7 ∅ 0,8	0,60	250V SU 1,25A 5x20	G087498P
		1,6		0,50	250V SU 1,60A 5x20	H087499P
		2		0,40	250V SU 2,00A 5x20	J087500P
		2,5		0,35	250V SU 2,50A 5x20	K087501P
		3,15		0,29	250V SU 3,15A 5x20	L087502P
		4		0,24	250V SU 4,00A 5x20	M087503P
		5		0,20	250V SU 5,00A 5x20	N087504P
		6,3		0,17	250V SU 6,30A 5x20	P087505P
		8		0,15	250V SU 8,00A 5x20	Q087506P
		10		0,14	250V SU 10,0A 5x20	R087507P
		12,5		0,12	250V SU 12,5A 5x20	S087508P

Miniature Fuses

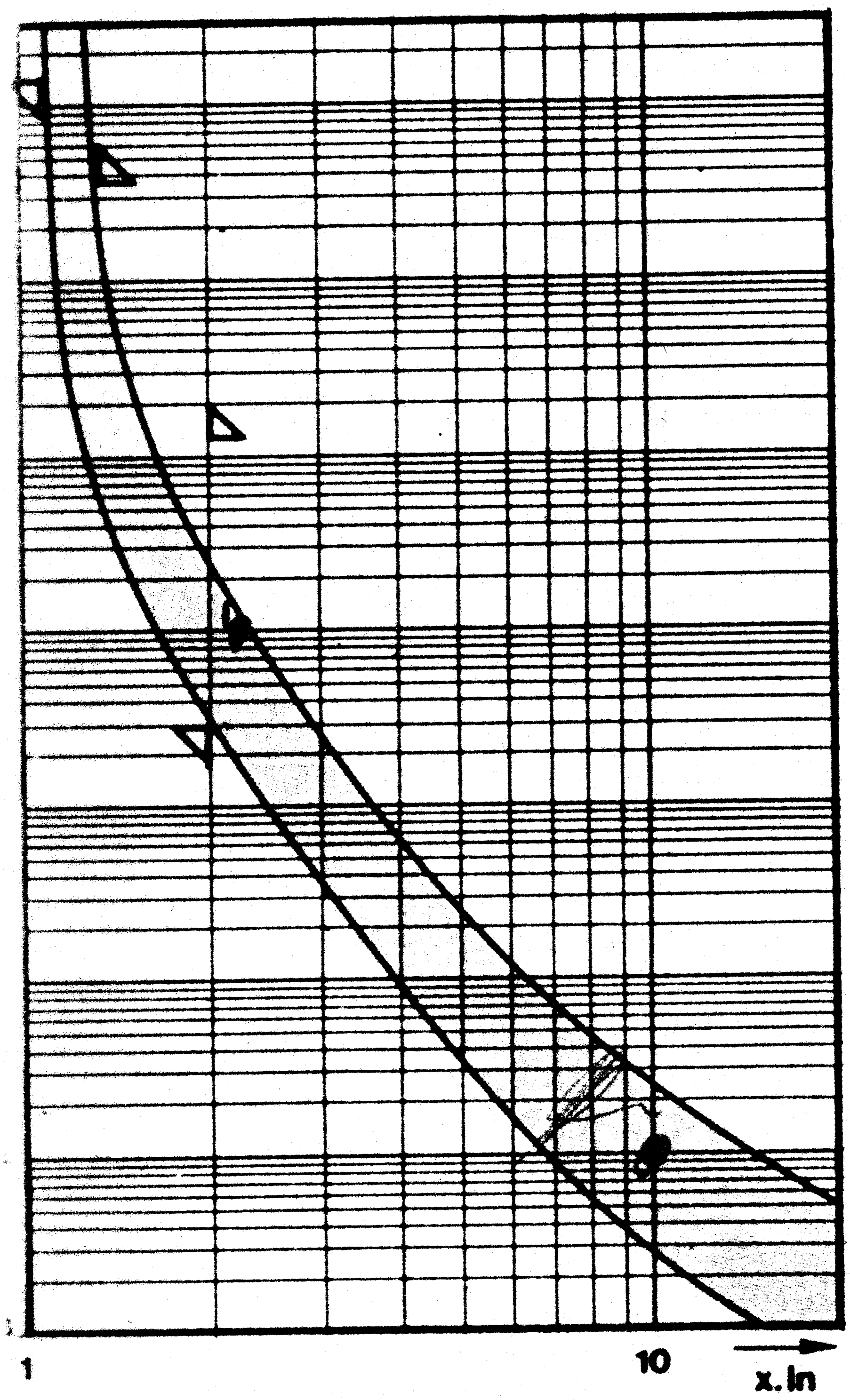
UL Fuses

Glass body / Ceramic body SU 5x20

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	1,1 In	1,35 In	2 In	
1,25 ∅ 15 A	4 h mini	1 h maxi	3 s mini	120 s maxi

Caractéristiques temps courant
Time-current characteristics



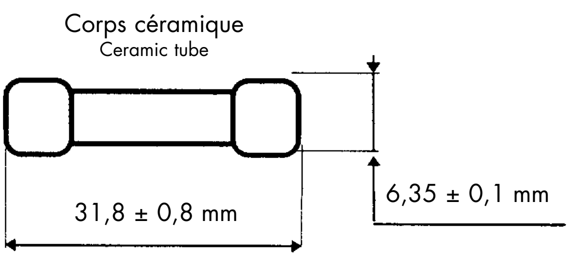
Ferraz Shawmut

Glass body / Ceramic body — 3AB 6x32

Conforme aux normes UL 198-G et CSA C22-2
Complying with UL 198-G and CSA C22-2

250 V ~
3AB RAPIDES (NORMAL BLOW)
DE (FROM) 0.1 A (TO) 15 A
TAILLE (SIZE): 6 x 32

Dimensions
Dimensions



Poids maximum : 2,2 g
Max weight : 2,2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

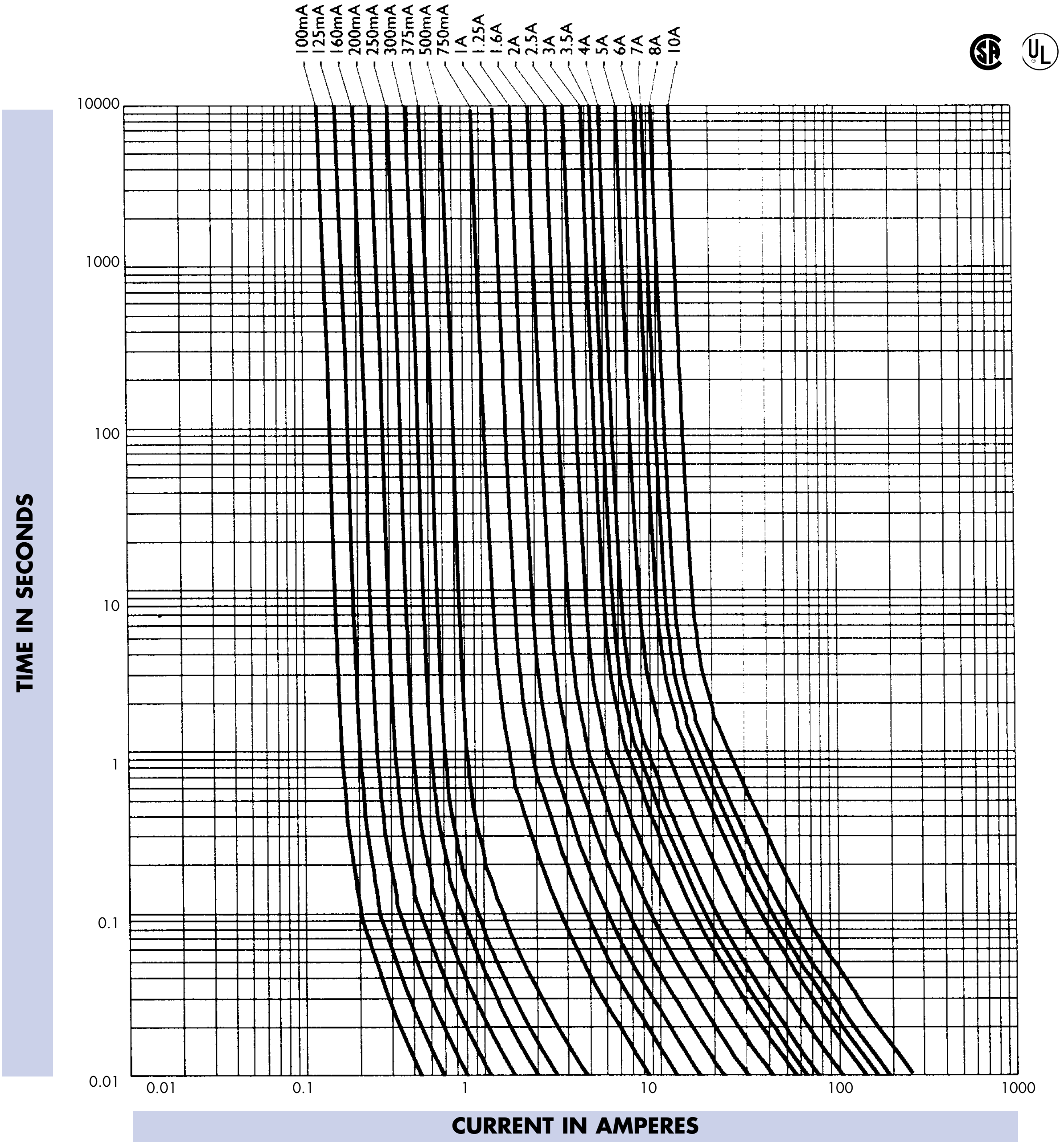
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References blister of
mm	V	A	A	A	V	V		1 000	50
6 x 32	250	0,1 A	35 A	10 000	1,5	4,5	250V 3AB 0,1 A 6 x 32	R208602T	R208602P
		0,125 A			1,8	4,5	250V 3AB 0,125 A 6 x 32	S208603T	S208603P
		0,16 A			1,73	4,2	250V 3AB 0,16 A 6 x 32	T208604T	T208604P
		0,2 A			1,66	3,9	250V 3AB 0,2 A 6 x 32	V208605T	V208605P
		0,25 A			1,6	3,6	250V 3AB 0,25 A 6 x 32	W208606T	W208606P
		0,3 A			1,5	3,4	250V 3AB 0,3 A 6 x 32	X208607T	X208607P
		0,375 A			1,4	3,2	250V 3AB 0,375 A 6 x 32	Y208608T	Y208608P
		0,5 A			1,4	2,9	250V 3AB 0,5 A 6 x 32	L206251T	L206251P
		0,75 A			0,17	0,2	250V 3AB 0,75 A 6 x 32	N206253T	N206253P
		1 A			0,15	0,23	250V 3AB 1 A 6 x 32	P206254T	P206254P
		1,5 A	100 A		0,13	0,2	250V 3AB 1,5 A 6 x 32	R206256T	R206256P
		2 A			0,12	0,18	250V 3AB 2 A 6 x 32	S206257T	S206257P
		2,5 A			0,12	0,17	250V 3AB 2,5 A 6 x 32	T206258T	T206258P
		3 A			0,11	0,162	250V 3AB 3 A 6 x 32	V206259T	V206259P
		3,5 A			0,11	0,157	250V 3AB 3,5 A 6 x 32	M206252T	M206252P
		4 A	200 A		0,11	0,154	250V 3AB 4 A 6 x 32	W206260T	W206260P
		4,5 A			00,11	0,154	250V 3AB 4,5 A 6 x 32	Q206255T	Q206255P
		5 A			0,1	0,146	250V 3AB 5 A 6 x 32	X206261T	X206261P
		6 A			0,1	0,139	250V 3AB 6 A 6 x 32	Y206262T	Y206262P
		7 A			0,09	0,135	250V 3AB 7 A 6 x 32	Z206263T	Z206263P
		8 A			0,09	0,132	250V 3AB 8 A 6 x 32	A206264T	A206264P
		10 A			0,008	0,125	250V 3AB 10 A 6 x 32	B206265T	B206265P
		12 A			—	—	250V 3AB 12 A 6 x 32	C206266T	C206266P
		15 A			—	—	250V 3AB 15 A 6 x 32	D206267T	D206267P

Glass body / Ceramic body 3AB 6x32

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	100 % x In	135 % x In	200% x In
0,5 -> 10 A	4 h mini	1 h maxi	5 s maxi

Caractéristiques temps courant
Time-current characteristics



Miniature Fuses

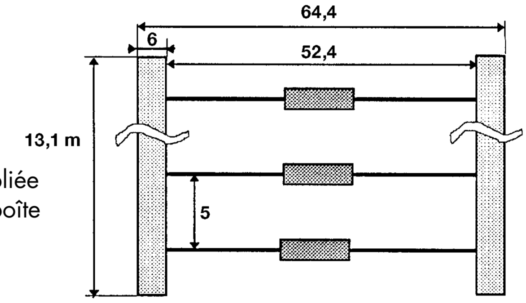
IEC Fuses

Subminiature MQ — Fast acting

Conforme à la norme CEI 127-3 feuille 2
Complying with IEC-127-3 Standard Sheet 2

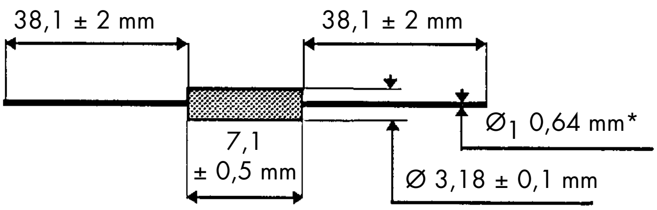
125 V ~
MQ RAPIDES (FAST ACTING)
DE (FROM) 0,1A A (TO) 15 A
TAILLE (SIZE): SUBMINIATURE

Dimensions
Dimensions

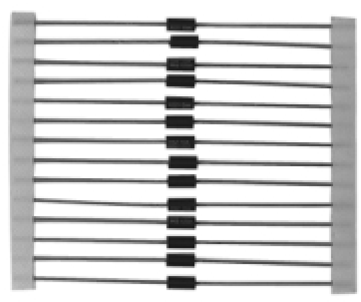


Conditionnée en bande pliée en accordéon dans une boîte
Packaging : Ammo-box

Poids maximum : 0,5 g
Max weight: 0.5 g



* $Ø_1$ = 0,81 mm pour (for) 10A, 15A



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References in blister of
mm	V	A	A	A	V	V		1 000	100
		0,100					125V F 0,100 A MQ AMMO	M 208 621 T	M 208 621 Q
		0,125			0,560	1,500	125V F 0,125 A MQ AMMO	G 090 695 T	G 090 695 Q
		0,250			0,900	1,875	125V F 0,250 A MQ AMMO	E 075 996 T	E 075 996 Q
		0,375			1,074	1,968	125V F 0,375 A MQ AMMO	F 075 997 T	F 075 997 Q
		0,500			0,778	1,423	125V F 0,500 A MQ AMMO	M 090 700 T	M 090 700 Q
		0,750			0,130	0,250	125V F 0,750 A MQ AMMO	G 075 998 T	G 075 998 Q
		1,000			0,127	0,235	125V F 1 A MQ AMMO	Q 090 703 T	Q 090 703 Q
		1,500			0,116	0,220	125V F 1,5 A MQ AMMO	H 075 999 T	H 075 999 Q
3,2 x 7,6	125	2,000	50	300	0,180	0,85	125V F 2 A MQ AMMO	T 090 706 T	T 090 706 Q
		2,500			0,165	0,270	125V F 2,5 A MQ AMMO	V 090 707 T	V 090 707 Q
		3,000			0,162	0,269	125V F 3 A MQ AMMO	W 090 708 T	W 090 708 Q
		3,500			0,158	0,263	125V F 3,5 A MQ AMMO	C 085 424 T	C 085 424 Q
		4,000			0,150	0,257	125V F 4 A MQ AMMO	X 090 709 T	X 090 709 Q
		5,000			0,147	0,205	125V F 5 A MQ AMMO	Y 090 710 T	Y 090 710 Q
		7,000*			0,135	0,200	125V F 7 A MQ AMMO	J 076 000 T	J 076 000 Q
		10,00*			0,068	0,120	125V F 10 A MQ AMMO	T 078 700 T	T 078 700 Q
		15,00*			0,081	0,140	125V F 15 A MQ AMMO	K 076 001 T	K 076 001 Q

* Calibres hors norme CEI * Ratings not covered by IEC standard

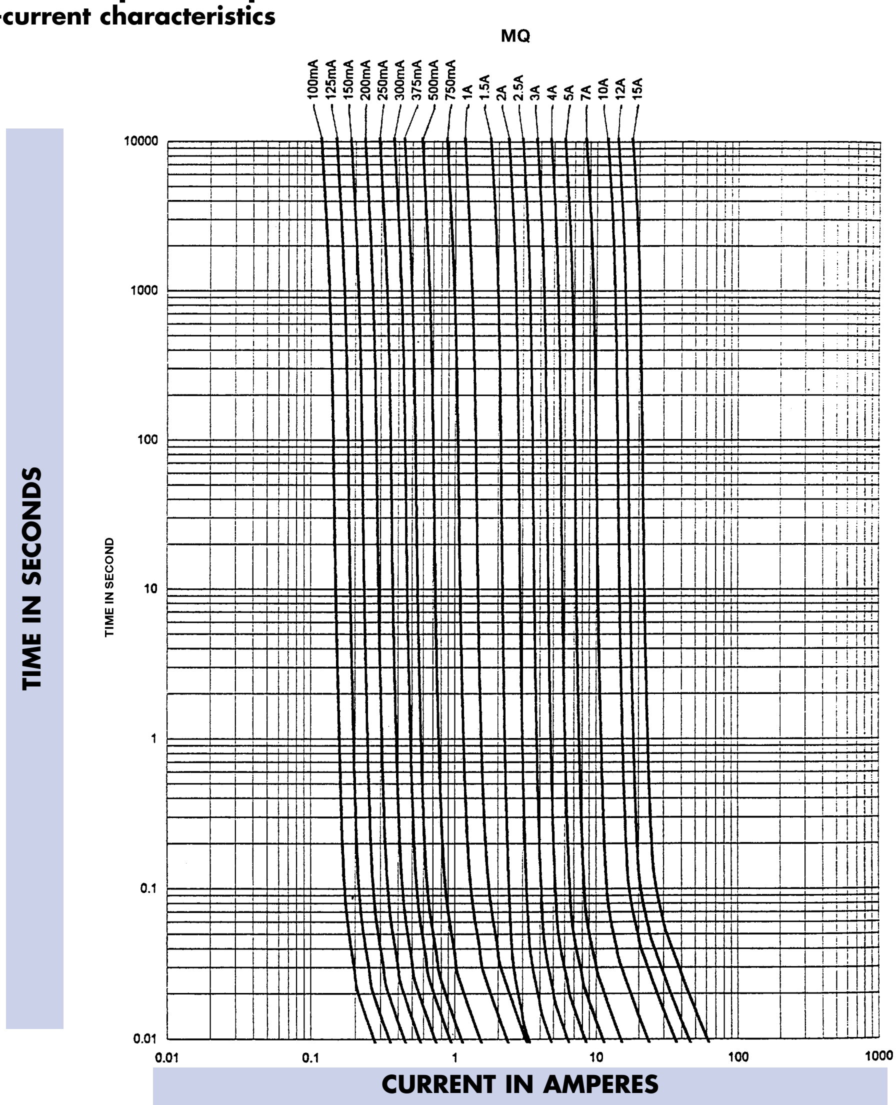
Subminiature MQ

Fast acting

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	100 % x In	200 % x In	275 % x In	400 % x In	1 000 % x In
100 mA -> 15 A	4 h mini	5 s maxi	300 ms maxi	30 ms maxi	4 ms maxi

Caractéristiques temps courant
Time-current characteristics



Remarques concernant le montage
Installation instructions

- Résistance à la chaleur lors de la soudure, selon CEI : 68-2-20 pendant 5 secondes.
  Soldering heat resistance as per IEC: 260°C for 5 seconds.

- Matière (Material) :
  - Boîtier (Body) : Thermodurcissable (Thermoset) V0 UL 94.
  - Connexion (Connection) : Cuivre étamé (Tin-plated copper)

Subminiature MRF

Fast acting

250 V ~

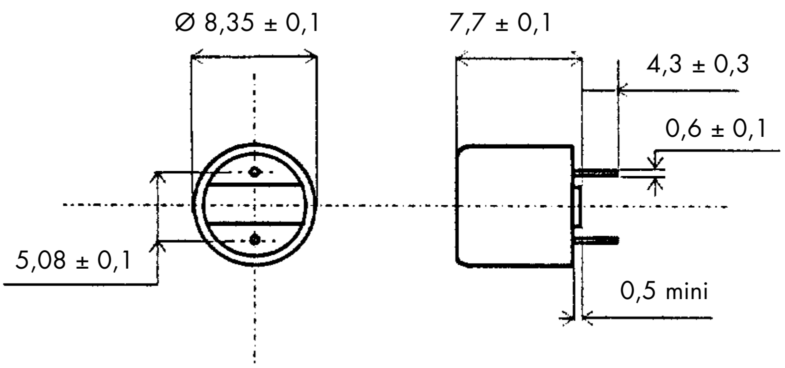
MRF RAPIDE (QUICK ACTING)

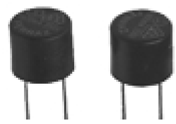
DE (FROM) 0,250A A (TO) 4 A

TAILLE (SIZE): SUBMINIATURE

Conforme à la norme CEI 127-3 feuille 3
Complying with IEC-127-3 Standard Sheet 3

Dimensions
Dimensions





Poids maximum : 0,5 g
Max weight: 0,5 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of 1 000	Référence en blister de References in blister of 100
mm	V	A	A	A	V	V			
Ø8,35 x h=7,7	250	0,250*	35				250V MRF 0,250 A	S 085 392 T	S 085 392 Q
		0,315*					250V MRF 0,315 A	T 085 393 T	T 085 393 Q
		0,400*					250V MRF 0,400 A	V 085 394 T	V 085 394 Q
		0,500					250V MRF 0,500 A	X 085 396 T	X 085 396 Q
		0,630					250V MRF 0,630 A	Y 085 397 T	Y 085 397 Q
		0,800					250V MRF 0,800 A	Z 085 398 T	Z 085 398 Q
		1,000					250V MRF 1 A	A 085 399 T	A 085 399 Q
		1,250					250V MRF 1,25 A	B 085 400 T	B 085 400 Q
		1,600					250V MRF 1,6 A	C 085 401 T	C 085 401 Q
		2,000					250V MRF 2 A	D 085 402 T	D 085 402 Q
		2,500					250V MRF 2,5 A	E 085 403 T	E 085 403 Q
		3,150					250V MRF 3,15 A	F 085 404 T	F 085 404 Q
		4,000	40				250V MRF 4 A	G 085 405 T	G 085 405 Q

* Calibres non homologués * Non-certified ratings

IEC Fuses

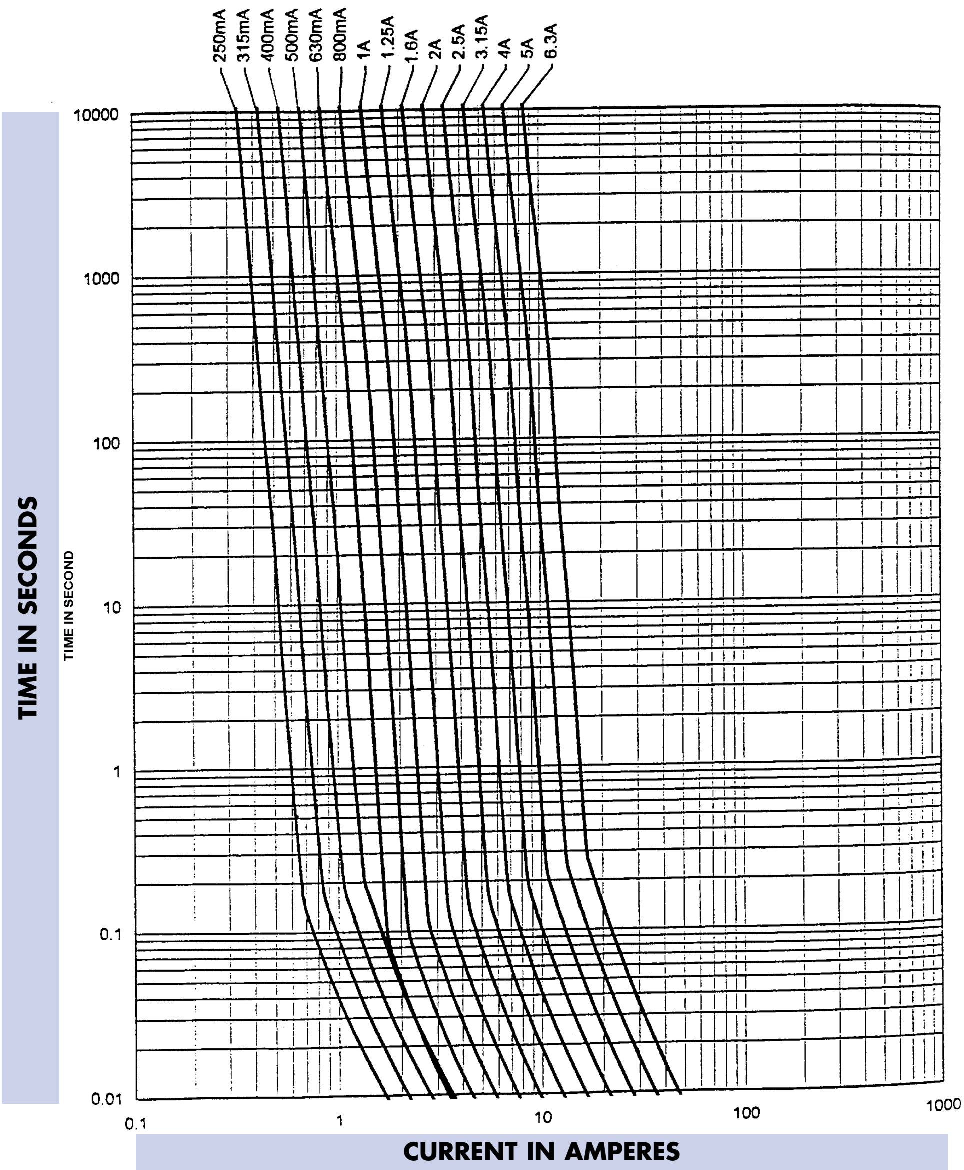
Subminiature MRF

Fast acting

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	210 % x In	275 % x In		400 % x In		1 000 % x In
250 mA -> 4 A	30 min maxi	10 ms mini	3 s maxi	3 ms mini	300 ms maxi	20 ms maxi

Caractéristiques temps courant
Time-current characteristics



Remarques concernant le montage
Installation instructions

- Résistance à la chaleur lors de la soudure, selon CEI : 68-2-20 pendant 5 secondes.
  Soldering heat resistance as per IEC: 260°C for 5 seconds.

- Matière (Material) :
  - Boîtier (Body) : Thermodurcissable (Thermoset) V0 UL 94.
  - Connexion (Connection) : Cuivre étamé (Tin-plated copper)

Ferraz Shawmut

Miniature Fuses

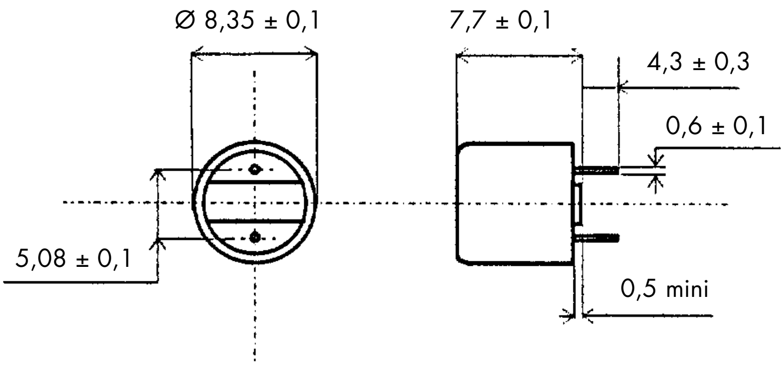
IEC Fuses

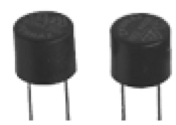
Subminiature MRT — Time lag

Conforme à la norme CEI 127-3 feuille 4
Complying with IEC-127-3 Standard Sheet 4

250 V ~
MRT TEMPORISES (TIME LAG)
DE (FROM) 0,080A A (TO) 4 A
TAILLE (SIZE) : SUBMINIATURE

Dimensions
Dimensions





Poids maximum : 0,5 g
Max weight: 0.5 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of 1 000	Référence en blister de References in blister of 100
mm	V	A	A	A	V	V			
		0,080*			0,380	0,400	250V MRT 0,080 A	C 081 767 T	C 081 767 Q
		0,100*			0,330	0,350	250V MRT 0,100 A	D 082 550 T	D 082 550 Q
		0,125*	35		0,280	0,300	250V MRT 0,125 A	E 082 551 T	E 082 551 Q
		0,160*			0,260	0,280	250V MRT 0,160 A	F 082 552 T	F 082 552 Q
		0,200*			0,240	0,260	250V MRT 0,200 A	G 082 553 T	G 082 553 Q
		0,250			0,220	0,240	250V MRT 0,250 A	H 082 554 T	H 082 554 Q
		0,315			0,200	0,220	250V MRT 0,315 A	J 082 555 T	J 082 555 Q
		0,400			0,180	0,200	250V MRT 0,400 A	K 082 556 T	K 082 556 Q
8,35 x h=7,7	250	0,500			0,170	0,190	250V MRT 0,500 A	L 082 557 T	L 082 557 Q
		0,630			0,160	0,180	250V MRT 0,630 A	M 082 558 T	M 082 558 Q
		0,800			0,140	0,160	250V MRT 0,800 A	N 082 559 T	N 082 559 Q
		1,000	50		0,120	0,140	250V MRT 1 A	P 082 560 T	P 082 560 Q
		1,250			0,110	0,130	250V MRT 1,25 A	Q 082 561 T	Q 082 561 Q
		1,600			0,100	0,120	250V MRT 1,6 A	R 082 562 T	R 082 562 Q
		2,000			0,080	0,100	250V MRT 2 A	S 082 563 T	S 082 563 Q
		2,500			0,080	0,100	250V MRT 2,5 A	T 082 564 T	T 082 564 Q
		3,150			0,080	0,100	250V MRT 3,15 A	V 082 565 T	V 082 565 Q
		4,000			0,080	0,100	250V MRT 4 A	W 082 566 T	W 082 566 Q

* Calibres non homologués * Non-certified ratings

Subminiature MRT

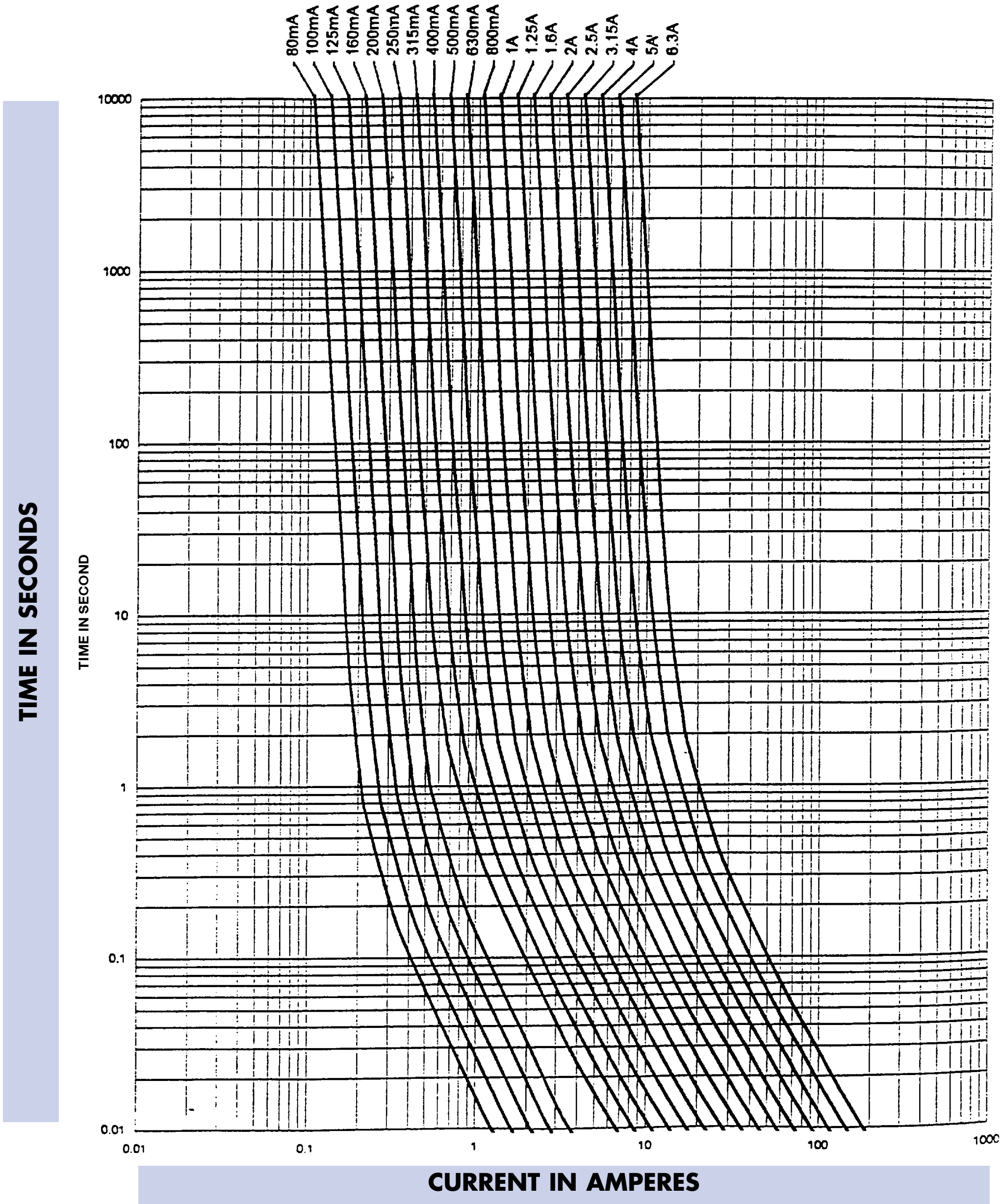
Time lag

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	210 % x In	275 % x In		400 % x In		1 000 % x In	
80 mA -> 4 A	2 min maxi	400 ms mini	10 s maxi	150 ms mini	3 s maxi	20 ms mini	150 ms maxi

Caractéristiques temps courant
Time-current characteristics

MRT



Remarques concernant le montage
Installation instructions

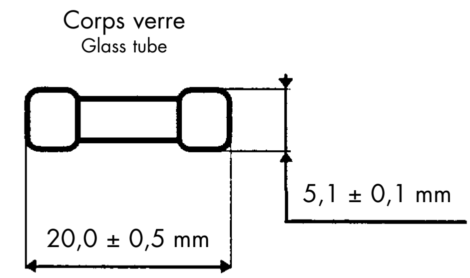
- Résistance à la chaleur lors de la soudure, selon CEI : 68-2-20 pendant 5 secondes.
  Soldering heat resistance as per IEC: 260°C for 5 seconds
- Matière / Material :
  Boîtier (Body) Thermoplastique (Thermoset) V0 UL 94.
  Connexion (Connection) : Cuivre étamé (Tin-plated copper)

5SF 5x20 — Fast acting

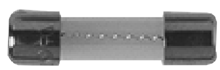
Conforme à la norme CEI 127-2 feuille 2
Complying with IEC-127-2 Standard Sheet 2

250 V ~
5SF RAPIDES (FAST ACTING)
DE (FROM) 0.08A A (TO) 10 A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions



Poids maximum : 1,2 g
Max weight: 1.2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	Pouvoir de Coupure 125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References blister of
mm	V	A	A	A	V	V		1 000	50
		0,08			0,62	0,93	250V 5SF 0,08 A 5 x 20	Z090504T	Z090504P
		0,1			0,56	0,84	250V 5SF 0,1 A 5 x 20	A090505T	A090505P
		0,125			0,5	0,76	250V 5SF 0,125 A 5 x 20	B090506T	B090506P
		0,16			0,46	0,68	250V 5SF 0,16 A 5 x 20	C090507T	C090507P
		0,2			0,41	0,62	250V 5SF 0,2 A 5 x 20	D090508T	D090508P
		0,25			0,37	0,56	250V 5SF 0,25 A 5 x 20	E090509T	E090509P
		0,315			0,33	0,50	250V 5SF 0,315 A 5 x 20	F090510T	F090510P
		0,4			0,3	0,45	250V 5SF 0,4 A 5 x 20	G090511T	G090511P
		0,5	35		0,1	0,14	250V 5SF 0,5 A 5 x 20	H090512T	H090512P
5 x 20	250	0,63			0,1	0,13	250V 5SF 0,63 A 5 x 20	J090513T	J090513P
		0,8			0,1	0,13	250V 5SF 0,8 A 5 x 20	K090514T	K090514P
		1			0,09	0,12	250V 5SF 1 A 5 x 20	L090515T	L090515P
		1,25			0,09	0,11	250V 5SF 1,25 A 5 x 20	M090516T	M090516P
		1,6			0,08	0,11	250V 5SF 1,6 A 5 x 20	N090517T	N090517P
		2			0,08	0,10	250V 5SF 2 A 5 x 20	P090518T	P090518P
		2,5			0,07	0,10	250V 5SF 2,5 A 5 x 20	Q090519T	Q090519P
		3,15			0,07	0,09	250V 5SF 3,15 A 5 x 20	R090520T	R090520P
		4	40		0,07	0,09	250V 5SF 4 A 5 x 20	S090521T	S090521P
		5	50		0,06	0,08	250V 5SF 5 A 5 x 20	T090522T	T090522P
		6,3	63		0,06	0,08	250V 5SF 6,3 A 5 x 20	V090523T	V090523P
		8*	80		0,06	0,08	250V 5SF 8 A 5 x 20	W090524T	W090524P
		10*	100		0,06	0,07	250V 5SF 10 A 5 x 20	X090525T	X090525P

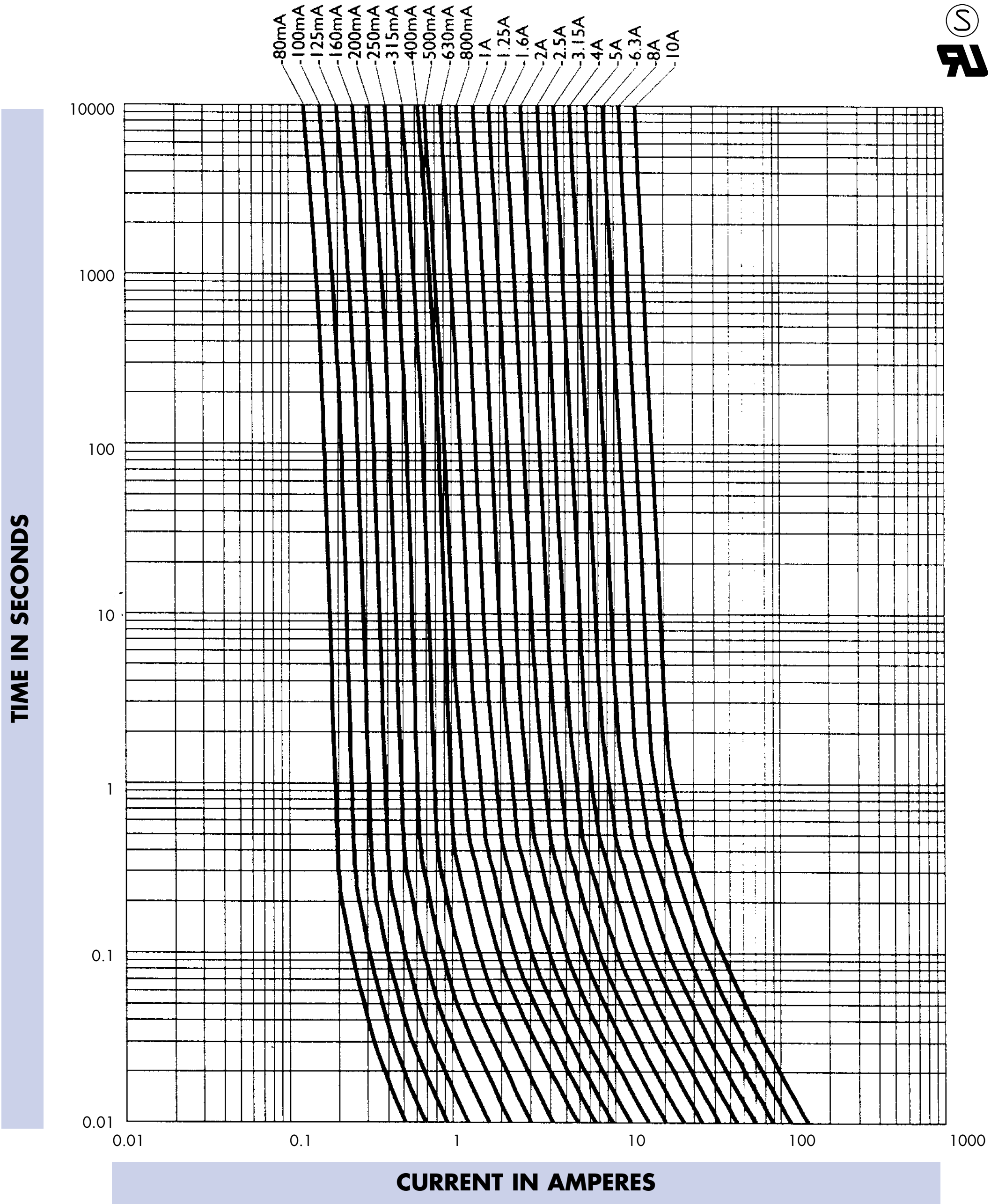
* Calibres hors normes * Non-standard ratings

5SF 5x20 Fast acting

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	210 % x In	275 % x In		400 % x In		1 000 % x In
0,08 mA -> 100 mA	30 min maxi	10 ms mini	500 ms maxi	3 ms mini	100 ms maxi	20 ms maxi
125 mA -> 10 A	30 min maxi	50 ms mini	2 s maxi	10 ms mini	300 ms maxi	20 ms maxi

Caractéristiques temps courant
Time current characteristics



Miniature Fuses

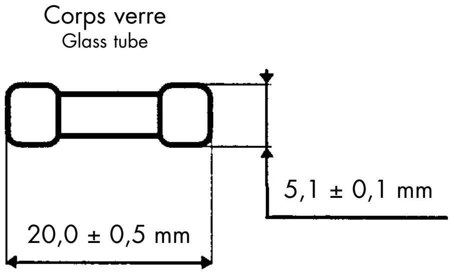
IEC Fuses

5ST 5x20 — Time lag

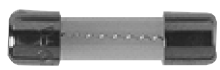
Conforme à la norme CEI 127-2 feuille 3
Complying with IEC-127-2 Standard Sheet 3

250 V ~
5ST TEMPORISES (TIME LAG)
DE (FROM) 0.063A A (TO) 10 A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions



Poids maximum : 1,2 g
Max weight: 1.2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	Pouvoir de Coupure Breaking Capacity sous/under 125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	Chute maxi de tension à : Max voltage drop at In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References in blister of
mm	V	A	A	A	V	V		1 000	50
		0,063			1,9	2,77	250V 5ST 0,063 A 5 x 20	D090531T	D090531P
		0,08			1,5	2,24	250V 5ST 0,08 A 5 x 20	E090532T	E090532P
		0,1			1,2	1,82	250V 5ST 0,1 A 5 x 20	F090533T	F090533P
		0,125			1	1,47	250V 5ST 0,125 A 5 x 20	G090534T	G090534P
		0,16			0,8	1,19	250V 5ST 0,16 A 5 x 20	H090535T	H090535P
		0,2			0,62	0,97	250V 5ST 0,2 A 5 x 20	J090536T	J090536P
		0,25			0,5	0,78	250V 5ST 0,25 A 5 x 20	K090537T	K090537P
		0,315			0,4	0,63	250V 5ST 0,315 A 5 x 20	L090538T	L090538P
		0,4			0,32	0,51	250V 5ST 0,4 A 5 x 20	M090539T	M090539P
		0,5	35		0,26	0,42	250V 5ST 0,5 A 5 x 20	N090540T	N090540P
5 x 20	250	0,63			0,13	0,17	250V 5ST 0,63 A 5 x 20	P090541T	P090541P
		0,8			0,11	0,15	250V 5ST 0,8 A 5 x 20	Q090542T	Q090542P
		1			0,08	0,10	250V 5ST 1 A 5 x 20	R090543T	R090543P
		1,25			0,08	0,09	250V 5ST 1,25 A 5 x 20	S090544T	S090544P
		1,6			0,07	0,09	250V 5ST 1,6 A 5 x 20	T090545T	T090545P
		2			0,07	0,08	250V 5ST 2 A 5 x 20	V090546T	V090546P
		2,5			0,06	0,07	250V 5ST 2,5 A 5 x 20	W090547T	W090547P
		3,15			0,06	0,07	250V 5ST 3,15 A 5 x 20	X090548T	X090548P
		4	40		0,05	0,06	250V 5ST 4 A 5 x 20	Y090549T	Y090549P
		5	50		0,05	0,06	250V 5ST 5 A 5 x 20	Z090550T	Z090550P
		6,3	63		0,05	0,06	250V 5ST 6,3 A 5 x 20	A090551T	A090551P
		8*	80		0,05	0,06	250V 5ST 8 A 5 x 20	P206070T	P206070P
		10*	100		0,05	0,06	250V 5ST 10 A 5 x 20	Q206071T	Q206071P

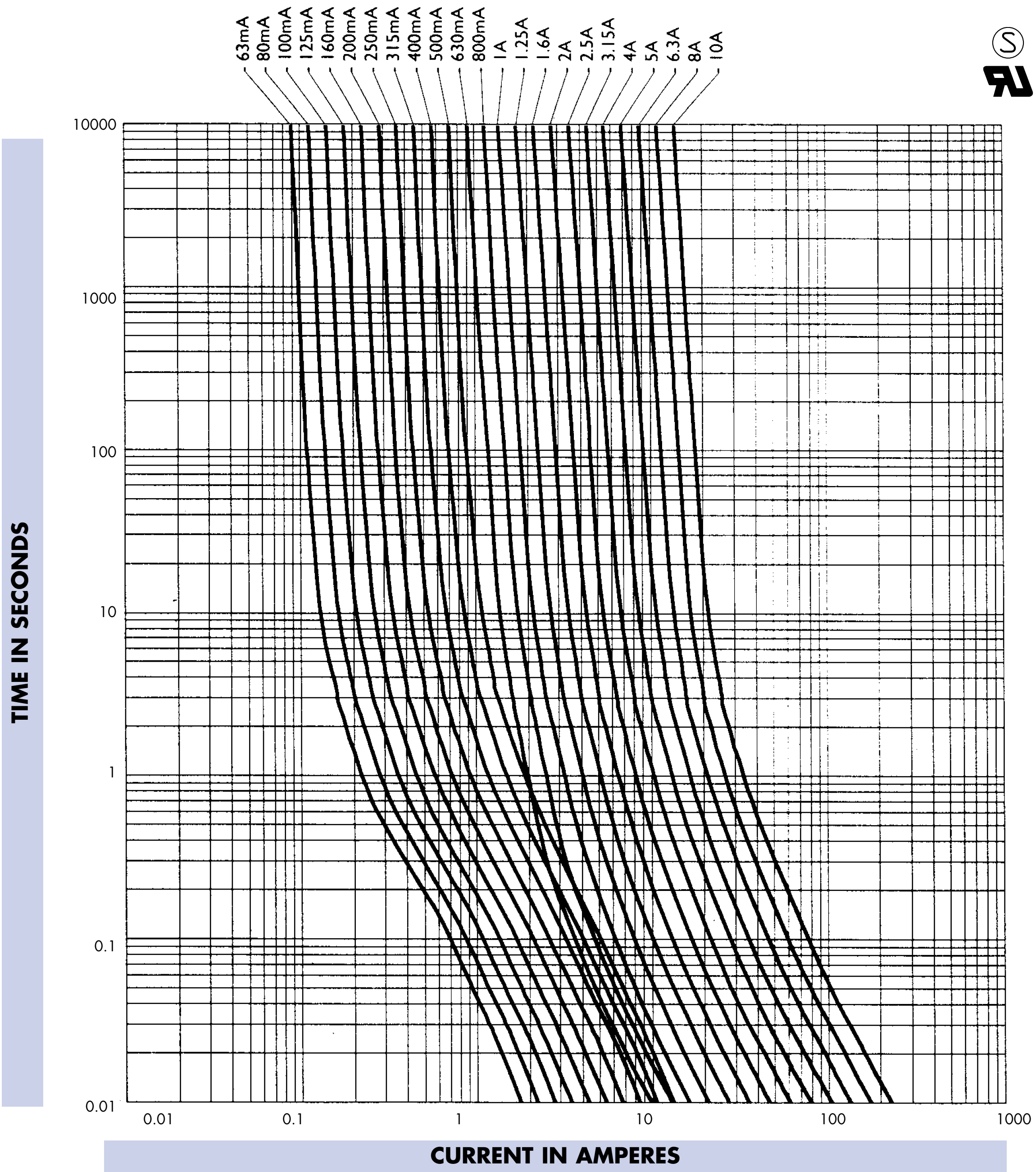
* Calibres hors normes   * Non-standard ratings

5ST 5x20 Time lag

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	210 % x In	275 % x In		400 % x In		1 000 % x In	
0,063 A -> 0,1 A	2 min maxi	200 ms mini	10 s maxi	40 ms mini	3 s maxi	10 ms mini	300 ms maxi
0,125 A -> 10 A	2 min maxi	600 ms mini	10 s maxi	150 ms mini	3 s maxi	20 ms mini	300 ms maxi

Caractéristiques temps courant
Time-current characteristics



Ferraz Shawmut

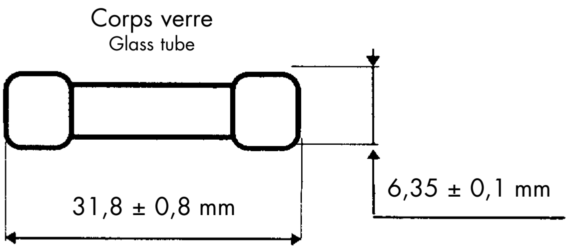
IEC Fuses

3SF 6x32 — Fast acting

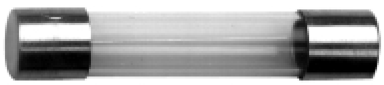
Conforme à la norme CEI 127-2 feuille 4
Complying with IEC-127-2 Standard Sheet 4

250V / 150V / 60 V ~
3SF RAPIDES (FAST ACTING)
DE (FROM) 0.315 A (TO) 10 A
TAILLE (SIZE) : 6 x 32

Dimensions
Dimensions



Poids maximum : 2,2 g
Max weight : 2,2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under Un	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References in blister of
mm	V	A	A	V	V		1 000	50
6 x 32	250	0,315	35	1,4	3,15	250V 3SF 0,315 A 6.32 BOITE	P090564T	P090564P
		0,4		1,4	2,93	250V 3SF 0,4 A 6.32 BOITE	Q090565T	Q090565P
		0,5		0,014	0,26	250V 3SF 0,5 A 6.32 BOITE	R090566T	R090566P
		0,63		0,13	0,24	250V 3SF 0,63 A 6.32 BOITE	S090567T	S090567P
		0,8		0,12	0,23	250V 3SF 0,8 A 6.32 BOITE	T090568T	T090568P
		1		0,11	0,21	250V 3SF 1 A 6.32 BOITE	V090569T	V090569P
		1,25		0,1	0,2	250V 3SF 1,25 A 6.32 BOITE	W090570T	W090570P
		1,6		0,1	0,18	250V 3SF 1,6 A 6.32 BOITE	X090571T	X090571P
		2		0,1	0,17	250V 3SF 2 A 6.32 BOITE	Y090572T	Y090572P
	150*	2,5		0,09	0,16	250V 3SF 2,5 A 6.32 BOITE	Z090573T	Z090573P
		3,15		0,089	0,15	250V 3SF 3,15 A 6.32 BOITE	A090574T	A090574P
		4	40	0,087	0,15	250V 3SF 4 A 6.32 BOITE	B090575T	B090575P
		5	50	0,086	0,14	250V 3SF 5 A 6.32 BOITE	C090576T	C090576P
	60*	6,3	63	0,085	0,13	250V 3SF 6 A 6.32 BOITE	D090577T	D090577P
		8	80	0,08	0,13	250V 3SF 8 A 6.32 BOITE	E090578T	E090578P
		10	100	0,08	0,12	250V 3SF 10 A 6.32 BOITE	F090579T	F090579P

*Tension d'homologation / Approval voltage

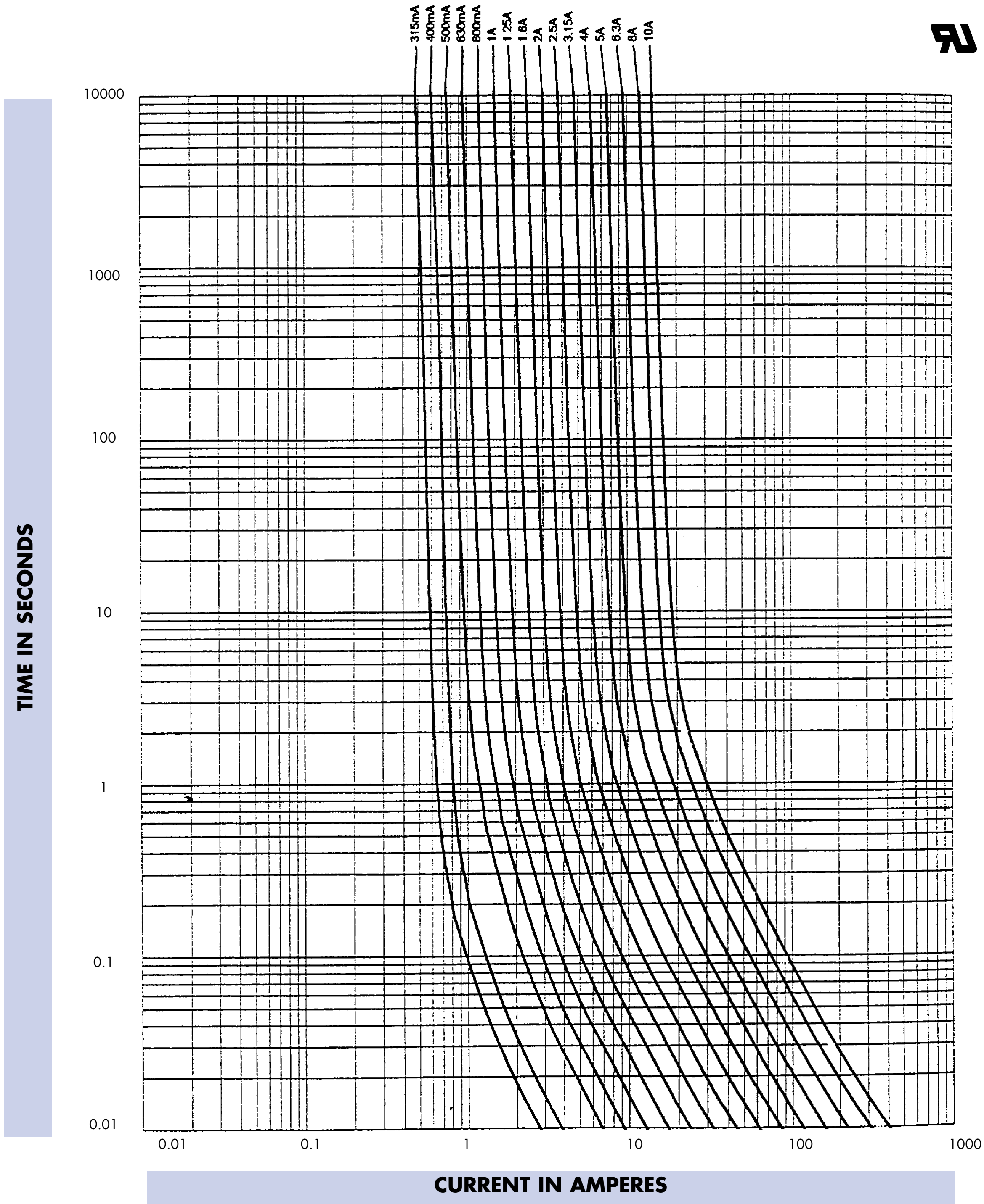
3SF 6x32

Fast acting

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	200 % x In	275 % x In		400 % x In		1 000 % x In
50 -> 100 mA	20 s maxi	2 ms mini	200 ms maxi	1 ms mini	30 ms maxi	5 ms maxi
125 mA -> 10 A	20 s maxi	20 ms mini	1500 ms maxi	8 ms mini	400 ms maxi	80 ms maxi

Caractéristiques temps courant
Time-current characteristics



Miniature Fuses

IEC Fuses

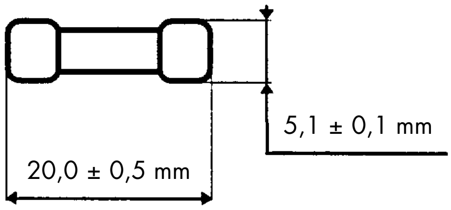
5HF 5x20 — High interrupting rating

Conforme à la norme CEI 127-2 feuille 1
Complying with IEC-127-2 Standard Sheet 1

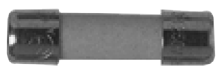
250 V ~
5HF RAPIDES (FAST ACTING)
DE (FROM) 0.1A A (TO) 10 A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions

Corps céramique
Ceramic tube



Poids maximum : 1,2 g
Max weight: 1.2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References in blister of
mm	V	A	A	A	V	V		1 000	50
		0,1#			0,37	0,56	250V 5HF 0,1 A 5 x 20	G095548T	G095548P
		0,125#			0,36	0,54	250V 5HF 0,125 A 5 x 20	H095549T	H095549P
		0,16#			0,34	0,52	250V 5HF 0,16 A 5 x 20	J095550T	J095550P
		0,2#			0,33	0,5	250V 5HF 0,2 A 5 x 20	Q095556T	Q095556P
		0,25#			0,32	0,48	250V 5HF 0,25 A 5 x 20	R095557T	R095557P
		0,315#			0,31	0,46	250V 5HF 0,315 A 5 x 20	S095558T	S095558P
		0,4#			0,3	0,44	250V 5HF 0,4 A 5 x 20	T095559T	T095559P
		0,5#			0,29	0,43	250V 5HF 0,5 A 5 x 20	V095560T	V095560P
5 x 20	250	0,63#	1 500		0,27	0,41	250V 5HF 0,63 A 5 x 20	W095561T	W095561P
		0,8#			0,13	0,2	250V 5HF 0,8 A 5 x 20	X095562T	X095562P
		1			0,12	0,18	250V 5HF 1 A 5 x 20	Y095563T	Y095563P
		1,25			0,12	0,17	250V 5HF 1,25 A 5 x 20	C095567T	C095567P
		1,6			0,11	0,16	250V 5HF 1,6 A 5 x 20	D095568T	D095568P
		2			0,1	0,15	250V 5HF 2 A 5 x 20	E095569T	E095569P
		2,5			0,09	0,14	250V 5HF 2,5 A 5 x 20	F095570T	F095570P
		3,15			0,09	0,14	250V 5HF 3,15 A 5 x 20	G095571T	G095571P
		4			0,09	0,13	250V 5HF 4 A 5 x 20	H095572T	H095572P
		5			0,08	0,12	250V 5HF 5 A 5 x 20	J095573T	J095573P
		6,3			0,08	0,113	250V 5HF 6,3 A 5 x 20	K095574T	K095574P
		8*#			0,07	0,106	250V 5HF 8 A 5 x 20	J085407T	J085407P
		10*#			0,07	0,1	250V 5HF 10 A 5 x 20	K085408T	K085408P

* Calibres hors normes   * Non-standard ratings

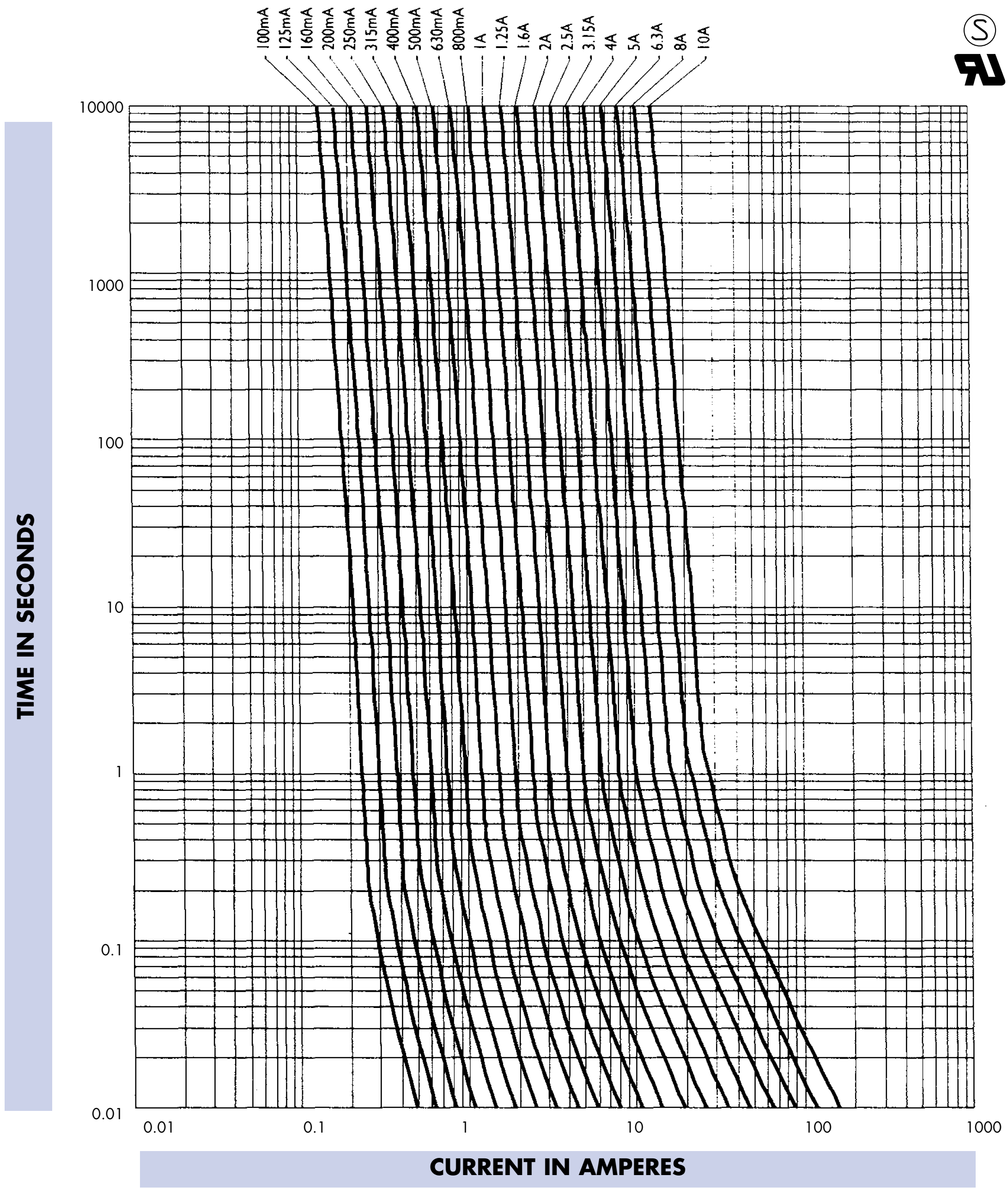
Produit non homologué
Product non-certified

5HF 5x20 High interrupting rating

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	210 % x In	275 % x In		400 % x In		1 000 % x In
1 A -> 3,15 A	30 min maxi	10 ms mini	2 s maxi	3 ms mini	300 ms maxi	20 ms maxi
4 A -> 10 A	30 min maxi	10 ms mini	3 s maxi	3 ms mini	300 ms maxi	20 ms maxi

Caractéristiques temps courant
Time-current characteristics



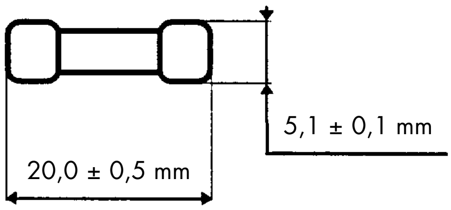
5HT 5x20 — High interrupting rating

Conforme à la norme CEI 127-2 feuille 5
Complying with IEC-127-2 Standard Sheet 5

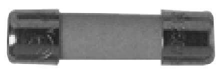
250 V ~
5HT TEMPORISES (TIME LAG)
DE (FROM) 0,25A A (TO) 10 A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions

Corps céramique
Ceramic tube



Poids maximum : 1,2 g
Max weight: 1,2 g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure Breaking Capacity sous/under 250 V	125 V	Chute maxi de tension à : Max voltage drop at 0,75 In	In	Désignation Designation	Référence en boîte de References in box of	Référence en blister de References in blister of
mm	V	A	A	A	V	V		1 000	50
5 x 20	250	0,25# 0,315# 0,4# 0,5# 0,63# 0,8# 1 1,25 1,6 2 2,5 3,15 4 5 6,3 3,15 4 5 6,3 8* 10*	1 500		0,46	0,7	250V 5HT 0,25 A 5 x 20	P085366T	P085366P
							250V 5HT 0,315 A 5 x 20	R094821T	R094821P
							250V 5HT 0,4 A 5 x 20	W094825T	W094825P
					0,4	0,6	250V 5HT 0,5 A 5 x 20	S085369T	S085369P
							250V 5HT 0,63 A 5 x 20	X094826T	X094826P
					0,24	0,385	250V 5HT 0,8 A 5 x 20	V085371T	V085371P
					0,18	0,25	250V 5HT 1 A 5 x 20	W085372T	W085372P
					0,16	0,22	250V 5HT 1,25 A 5 x 20	X085373T	X085373P
					0,14	0,19	250V 5HT 1,6 A 5 x 20	Y085374T	Y085374P
					0,12	0,17	250V 5HT 2 A 5 x 20	Z085375T	Z085375P
					0,11	0,15	250V 5HT 2,5 A 5 x 20	A085376T	A085376P
					0,1	0,13	250V 5HT 3,15 A 5 x 20	B085377T	B085377P
					0,09	0,1	250V 5HT 4 A 5 x 20	C085378T	C085378P
					0,07	0,1	250V 5HT 5 A 5 x 20	D085379T	D085379P
					0,07	0,1	250V 5HT 6,3 A 5 x 20	E085380T	E085380P
					0,07	0,1	250V 5HT 8 A 5 x 20	A208357T	A208357P
					0,07	0,1	250V 5HT 10 A 5 x 20	B208358T	B208358P

* Calibres hors normes   * Non-standard ratings

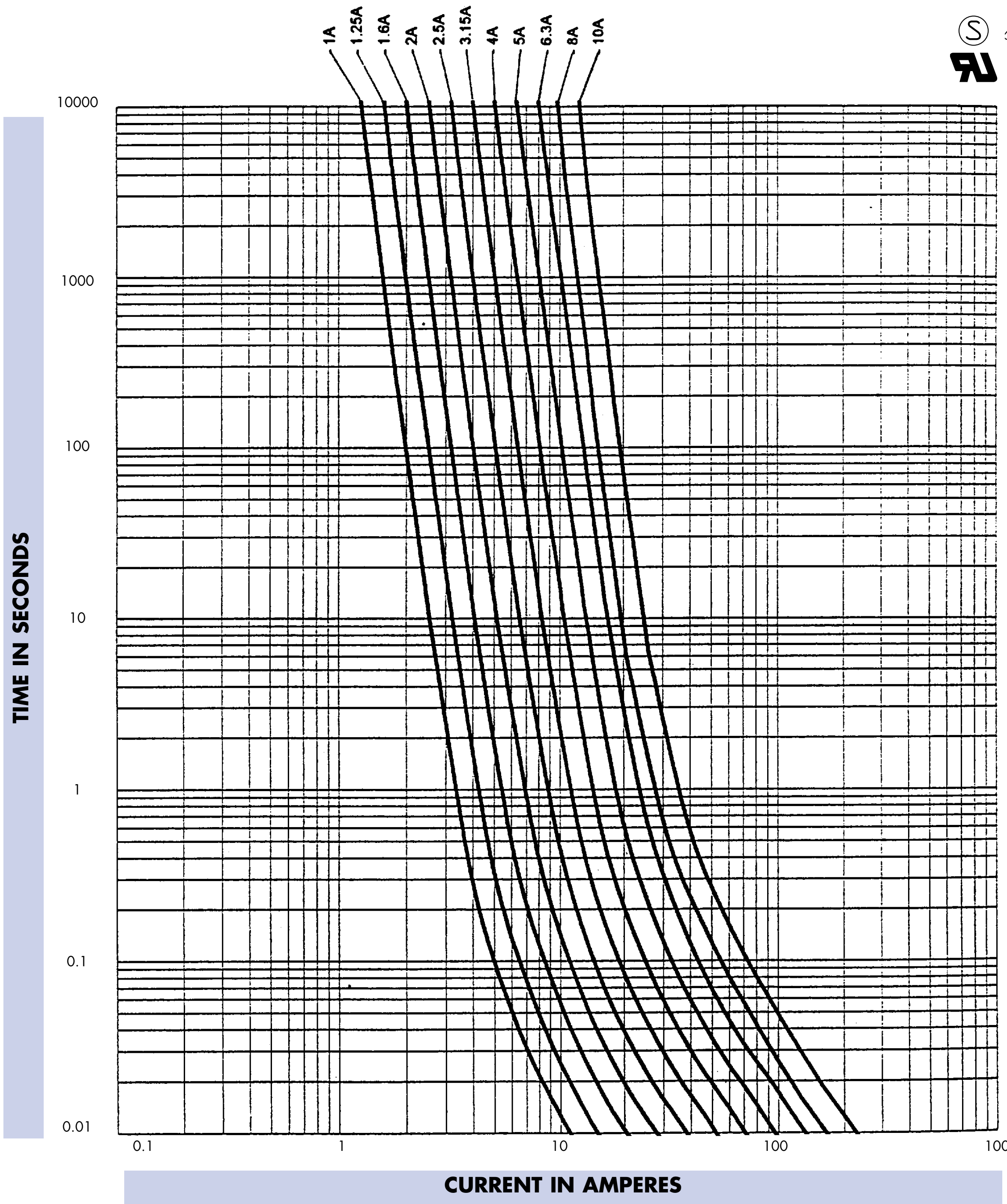
\# Produit non homologué
\# Product non-certified

5HT 5x20 High interrupting rating

Caractéristiques temps de fusion limites
Melting time limits

Courant Current	210 % x In	275 % x In		400 % x In		1 000 % x In	
1 A -> 3,15 A	30 min maxi	1 s mini	80 s maxi	95 ms mini	5 s maxi	10 ms mini	100 ms maxi
4 A -> 10 A	30 min maxi	1 s mini	80 s maxi	150 ms mini	5 s maxi	20 ms mini	100 ms maxi

Caractéristiques temps courant
Time-current characteristics



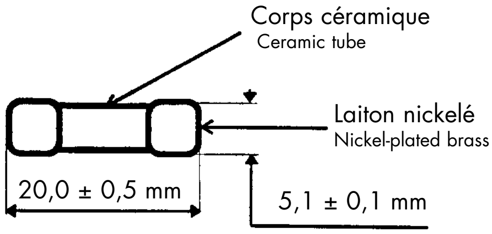
Semiconductor Fuses

5x20 FA/FB Very fast acting

Homologations reconnues UL E 90660
Approvals UL recognized E 90660

125 V - 250 V ~ FB - FA
TRÈS RAPIDE (VERY FAST ACTING)
DE (FROM) 0,04A A (TO) 20A
TAILLE (SIZE): 5 x 20

Dimensions
Dimensions





FA, FB: fusibles ensablés
FA,FB: fuses with filler

Poids maximum : 1,2 g
Max weight: 1.2 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

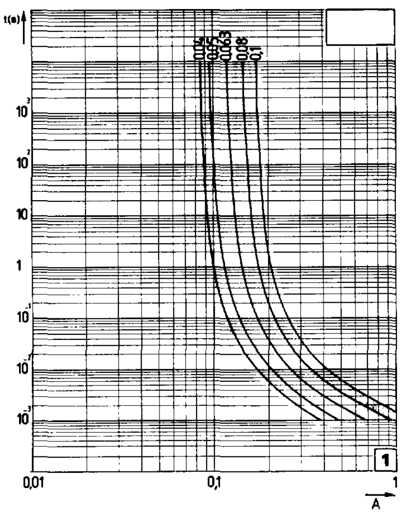
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister de References in in blister of
mm	V	A		A² s		V		50
		0,040*	250 V	0,00013	0,0004	1,5	250V FB 0,040 A 5x20	K084051P
		0,050*	4 kA	0,00020	0,0006	1,5	250V FB 0,050 A 5x20	Q080468P
		0,063*	cos φ	0,00041	0,0012	1,3	250V FB 0,063 A 5x20	N084054P
		0,080*	0,7	0,00077	0,0022	1,1	250V FB 0,080 A 5x20	P080467P
		0,100*		0,00131	0,0037	1,1	250V FB 0,100 A 5x20	L084052P
		0,125		0,00077	0,0021	1,7	250V FA 0,125 A 5x20	L084029P
		0,160	250 V	0,0020	0,006	1,3	250V FA 0,160 A 5x20	F084001P
		0,200	30 kA	0,0046	0,013	1,1	250V FA 0,200 A 5x20	Y084017P
		0,250	cos φ	0,009	0,025	1,0	250V FA 0,250 A 5x20	G084002P
		0,315	0,2	0,016	0,045	0,90	250V FA 0,315 A 5x20	Z084018P
		0,400		0,03	0,085	0,85	250V FA 0,400 A 5x20	A084019P
5		0,500		0,05	0,15	0,80	250V FA 0,500 A 5x20	H084003P
x	250	0,630	Homologation	0,12	0,35	0,70	250V FA 0,630 A 5x20	X084016P
20		0,800	for approvals	0,25	0,72	0,60	250V FA 0,800 A 5x20	C084021P
		1,000	(UL 198G)	0,11	0,25	0,46	250V FA 1,000 A 5x20	J084004P
		1,250	Ic = 10 kA	0,26	0,65	0,36	250V FA 1,250 A 5x20	K084005P
		1,600	sous / under	0,39	0,9	0,42	250V FA 1,600 A 5x20	L084006P
		2,000	250 V	0,81	1,9	0,37	250V FA 2,000 A 5x20	M084007P
		2,500	cos φ	1,44	3,2	0,34	250V FA 2,500 A 5x20	N084008P
		3,150	0,7	2,46	5,5	0,33	250V FA 3,150 A 5x20	P084009P
		4,000		4,6	10	0,31	250V FA 4,000 A 5x20	Q084010P
		5,000		11	25	0,24	250V FA 5,000 A 5x20	R084011P
		6,300		23	50	0,20	250V FA 6,300 A 5x20	S084012P
		8	250 V	2,5	40	0,10	250V FA 8,000 A 5x20	T084013P
		10	10 kA	4,5	70	0,095	250V FA 10,00 A 5x20	V084014P
		# 12,5	cos φ 0,7	8,1	120	0,090	250V FA 12,50 A 5x20	W084015P
	125	# 16*	10 kA 125 V	25	160	0,062	125V FA 16,00 A 5x20	R084034P
		# 20*	cos φ 0,7	51	330	0,056	125V FA 20,00 A 5x20	D084022P

* Calibre non homologué. * Non-certified rating
Pour ces calibres, l'échauffement dans les portes-fusibles doit être vérifié. # For these ratings, heating within fuse holders must be checked
Pour un conditionnement en boîte de 1000 pièces, nous consulter. Ask us about boxes of 1000 pieces

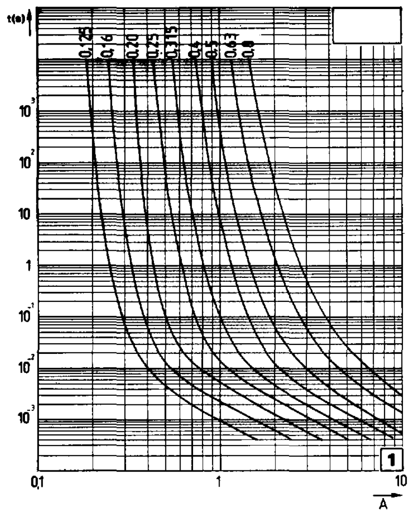
5x20 — FA/FB Very fast acting

Caractéristiques temps courant
Time-current characteristics

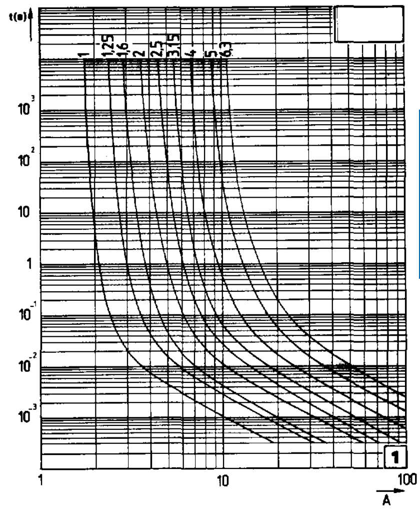
250 V FB 5 x 20



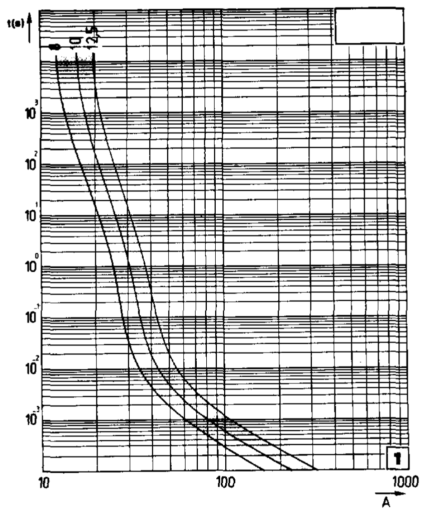
250 V FA 5 x 20



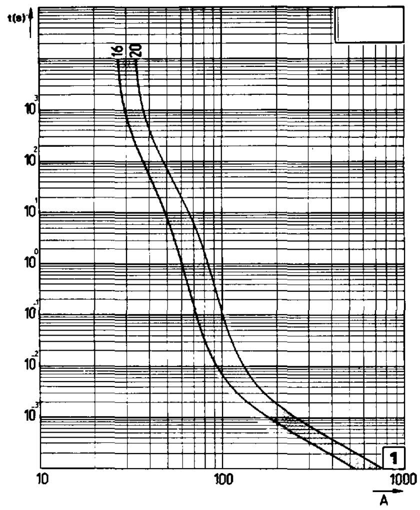
250 V FA 5 x 20



250 V FA 5 x 20



125 V FA 5 x 20

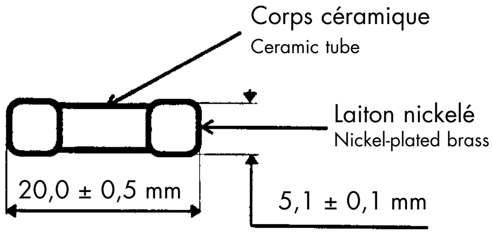


Tolérance sur I ± 12 %. t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I tolerance ± 12 %. Actual pre-arcing time (s). R.M.S. Value of prearcing current (A).

5x20 SA/SB Medium time lag

125 V - 250 V ~ SB - SA
SEMI TEMPORISE (MEDIUM TIME LAG)
DE (FROM) 0,04A A (TO) 16A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions





Les fusibles sont ensablés.
Fuses with filler.

Poids maximum : 1,2 g
Max weight: 1.2 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

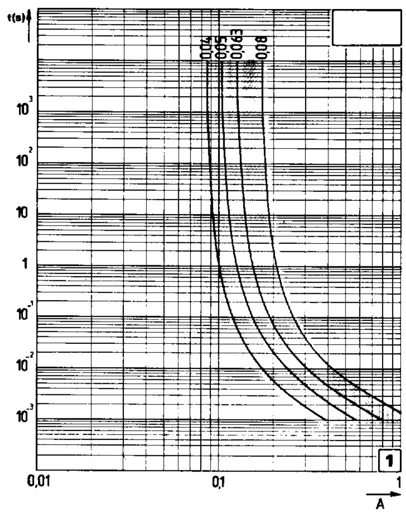
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	$[I^2t]$ mini de fusion Pre-arcing	$[I^2t]$ total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister de References in in blister of
mm	V	A		A^2 s		V		50
		0,040	250 V	0,00013	0,0004	1,5	250V SB 0,040 A 5x20	C080479P
		0,050	4 kA	0,00029	0,00082	1,2	250V SB 0,050 A 5x20	R080469P
		0,063	cos φ	0,00057	0,0016	1	250V SB 0,063 A 5x20	F080482P
		0,080	0,7	0,00131	0,0037	0,8	250V SB 0,080 A 5x20	B080478P
		0,100		0,00077	0,0021	1,4	250V SA 0,100 A 5x20	M084122P
		0,125		0,002	0,006	1,1	250V SA 0,125 A 5x20	L084121P
		0,160		0,0046	0,013	0,9	250V SA 0,160 A 5x20	P084101P
		0,200		0,009	0,025	0,8	250V SA 0,200 A 5x20	G084117P
		0,250		0,016	0,045	0,75	250V SA 0,250 A 5x20	Q084102P
		0,315		0,030	0,085	0,7	250V SA 0,315 A 5x20	H084118P
		0,400		0,050	0,15	0,68	250V SA 0,400 A 5x20	J084119P
5		0,500		0,12	0,35	0,55	250V SA 0,500 A 5x20	R084103P
x	250	0,630	250 V	0,11	0,25	0,26	250V SA 0,630 A 5x20	F084116P
20		0,800	10 kA	0,17	0,38	0,26	250V SA 0,800 A 5x20	K084120P
		1,000	cos φ 0,7	0,26	0,65	0,26	250V SA 1,000 A 5x20	S084104P
		1,250		0,55	1,2	0,2	250V SA 1,250 A 5x20	T087164P
		1,600		1,44	3,2	0,16	250V SA 1,600 A 5x20	D087173P
		2,000		2,46	5,5	0,15	250V SA 2,000 A 5x20	M087020P
		2,500		4,6	10	0,14	250V SA 2,500 A 5x20	N087021P
		3,150		11	25	0,11	250V SA 3,150 A 5x20	P087022P
		4,000		23	50	0,1	250V SA 4,000 A 5x20	Q087023P
		5,000		41	90	0,1	250V SA 5,000 A 5x20	R087024P
		6,300		15,7	50	0,11	250V SA 6,300 A 5x20	S087025P
		8		27,5	85	0,11	250V SA 8,000 A 5x20	T087026P
		10		53	160	0,1	250V SA 10,00 A 5x20	V087027P
		12,5*		63	200	0,095	250V SA 12,50 A 5x20	W087028P
	125	16*	10 kA 125 V	163	350	0,11	125V SA 16,00 A 5x20	W086338P
			cos φ 0,7					

* Pour ces calibres, l'échauffement dans les portes fusibles doit être vérifié. * For these ratings, heating within fuse holder must be checked.
Pour un conditionnement en boîte de 1000 pièces, nous consulter. Ask us about boxes of 1,000 pieces

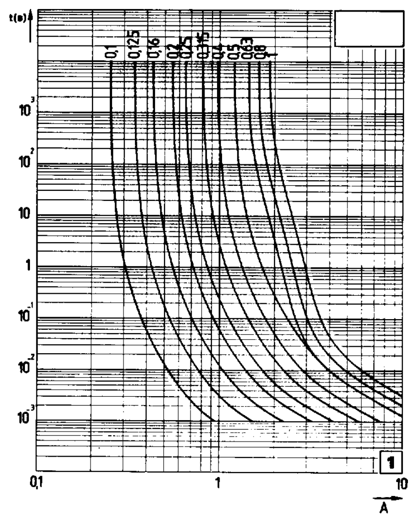
5x20 SA/SB Medium time lag

Caractéristiques temps courant
Time-current characteristics

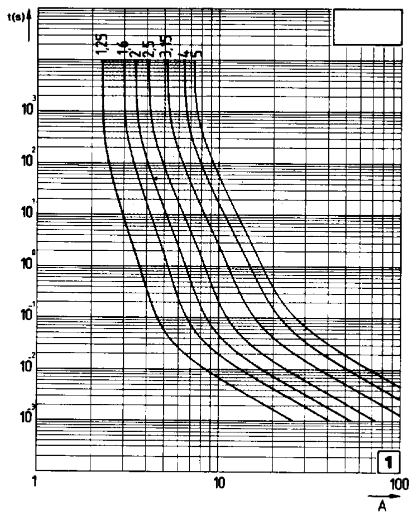
250 V SB 5 x 20



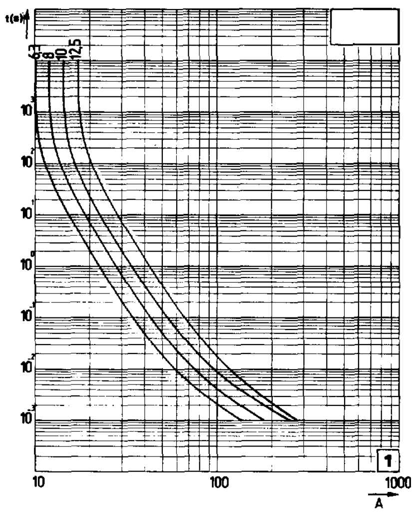
250 V SA 5 x 20



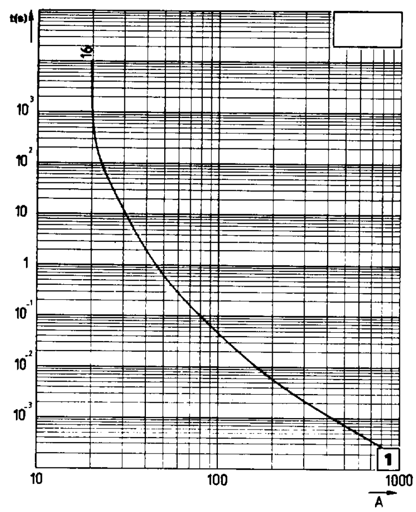
250 V SA 5 x 20



250 V SA 5 x 20



125 V SA 16 A



Tolérance sur I ± 12 %. t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I tolerance ± 12 %. Actual pre-arcing time (s). R.M.S. Value of pre-arcing current (A).

Ferraz Shawmut

Miniature Fuses

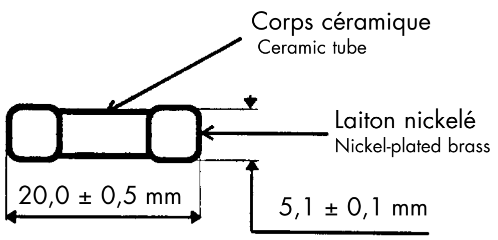
Semiconductor Fuses

5x20 — FC Fast acting

Conforme à la CEI 127-2 feuille 1
Complying with IEC 127-2 Standard Sheet 1

250 V ~ FC
RAPIDE (FAST ACTING)
DE (FROM) 0,16A A (TO) 10A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions





Fusibles ensablés
Sand-filled fuses

Poids maximum : 1,2 g
Max weight: 1.2 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 250V AC	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at 250 V	Chute maxi de tension à Max voltage drop at In	Désignation Code	Référence en boîte de References in box of
mm	V	A		A² s		V		1 000
		0,160		0,0011	0,0025	1,6	250V FC 0,160 A 5x20	S206027T
		0,200		0,0018	0,004	1,45	250V FC 0,200 A 5x20	T206028T
		0,250	Suivant	0,0035	0,008	1,3	250V FC 0,250 A 5x20	K206112T
		0,315	CEI 127	0,0072	0,016	1,15	250V FC 0,315 A 5x20	W206030T
		0,400	1 500 A	0,015	0,032	1,1	250V FC 0,400 A 5x20	X206031T
		0,500	sous 250 V	0,032	0,066	1	250V FC 0,500 A 5x20	Y206032T
		0,630	cos φ 0,7	0,052	0,082	0,45	250V FC 0,630 A 5x20	Z206033T
5		0,800*		0,098	0,16	0,4	250V FC 0,800 A 5x20	A206034T
x	250	1,000		0,2	0,32	0,37	250V FC 1,000 A 5x20	T205844T
20		1,250		0,11	0,35	0,55	250V FC 1,250 A 5x20	D206037T
		1,600	Suivant	0,28	0,55	0,42	250V FC 1,600 A 5x20	E206038T
		2,000	CEI 269.1 et	0,55	1,2	0,38	250V FC 2,000 A 5x20	F205119T
		2,500	CEI 269.3	1,1	2,4	0,34	250V FC 2,500 A 5x20	F206039T
		3,150	6 kA	2,5	5	0,28	250V FC 3,150 A 5x20	G206040T
		4,000	sous 250 V	6,1	12	0,23	250V FC 4,000 A 5x20	H206041T
		5,000	cos φ 0,2	11	22	0,21	250V FC 5,000 A 5x20	Y205411T
		6,300		25	45	0,18	250V FC 6,300 A 5x20	E205185T
		8*		72	130	0,13	250V FC 8,000 A 5x20	G205925T
		10*		150	270	0,11	250V FC 10,00 A 5x20	T205683T

* Calibre non homologué SEMKO. * Non-SEMKO approved rating.

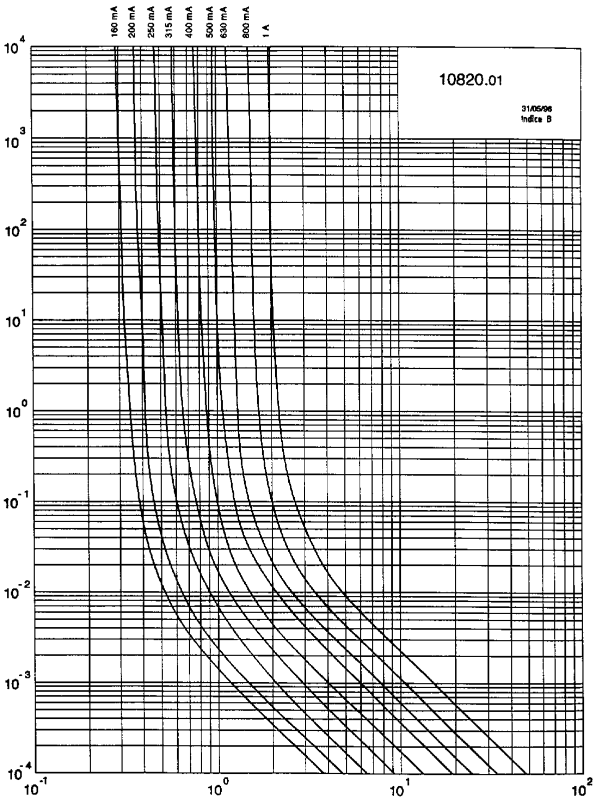
Miniature Fuses

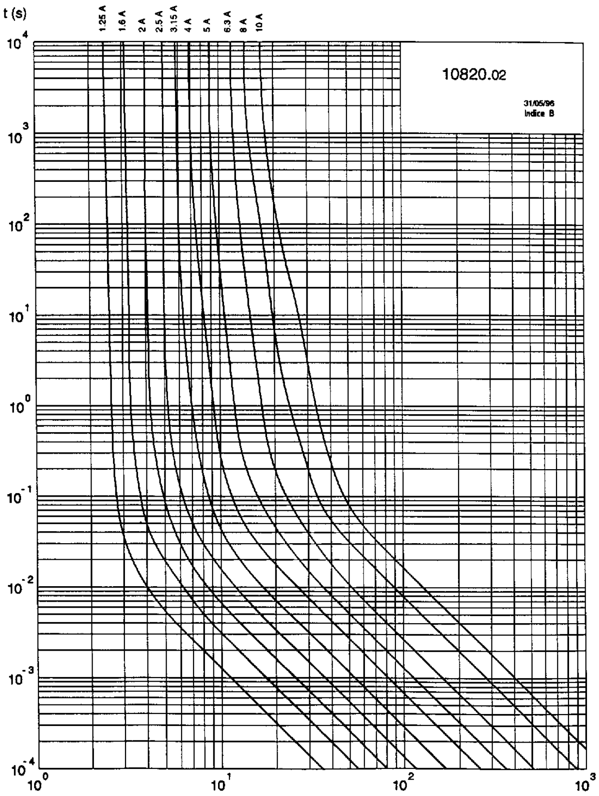
Semiconductor Fuses

5x20

FC Fast acting

Caractéristiques temps courant
Time-current characteristics





Tolérance sur I ± 12 %. t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I tolerance ± 12 %. Actual pre-arcing time (s). R.M.S. Value of pre-arcing current (A).

Conditionnement
Packaging

En boîte de 1 000 pièces.
In boxes of 1,000 pieces.

Ces fusibles peuvent être réalisés avec des sorties filaires : voir la fiche technique correspondante FC "AL" Fast Acting(M 6004 95).
These fuses are available with axial leads: refer to data sheet (M600495) FC "AL" Fast Acting .

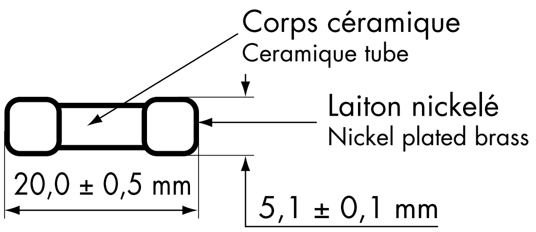
Miniature Fuses

Semiconductor Fuses

5x20 — FA Very fast acting

380 V ~ FA
TRES RAPIDE (VERY FAST ACTING)
DE (FROM) 0,1A A (TO) 4A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions



Fusibles ensablés
Fuses with filler

Poids maximum : 1,2 g
Max weight : 1,2 g

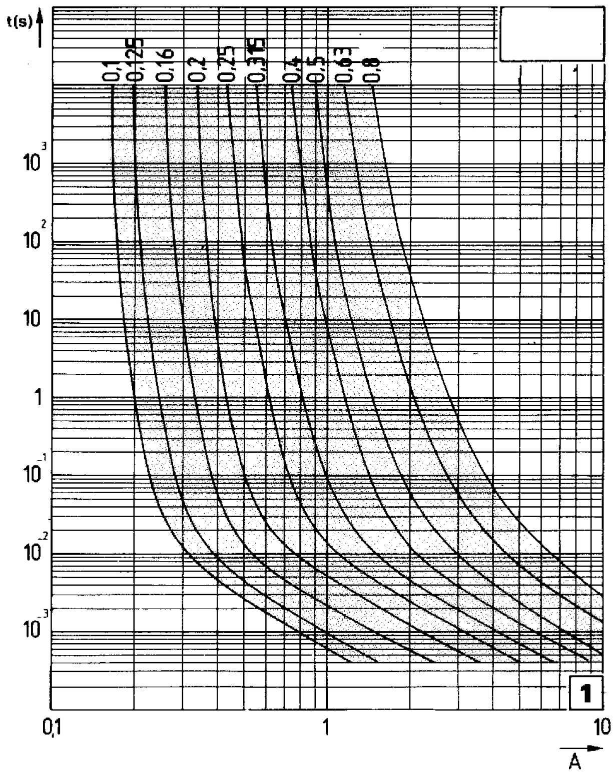
CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

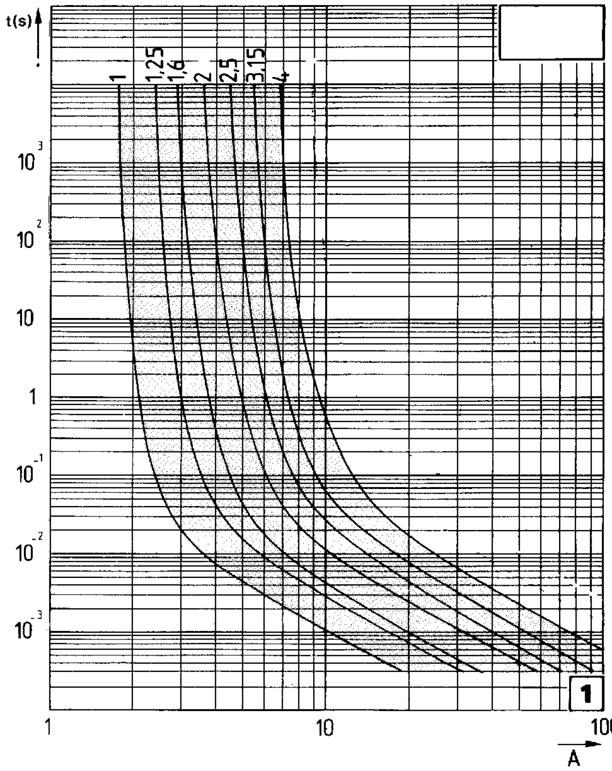
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 380V AC	$[I^2t]$ mini de fusion Pre-arcing	$[I^2t]$ total Total clearing at à Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A^2 s		V		50 pièces
		0,100		0,00057	0,0033	1,8	380V FA 0,100A 5 x 20	T093305P
		0,125		0,00077	0,0045	1,7	380V FA 0,125A 5 x 20	W093307P
		0,160		0,0020	0,0123	1,3	380V FA 0,160A 5 x 20	Y093309P
		0,200		0,0046	0,0275	1,1	380V FA 0,200A 5 x 20	P095992P
		0,250		0,009	0,054	1,0	380V FA 0,250A 5 x 20	E093315P
		0,315		0,016	0,095	0,90	380V FA 0,315A 5 x 20	Q093348P
		0,400		0,03	0,18	0,85	380V FA 0,400A 5 x 20	G093317P
5		0,500	380 V	0,05	0,3	0,80	380V FA 0,500A 5 x 20	H093318P
x	380	0,630	10 kA	0,12	0,73	0,70	380V FA 0,630A 5 x 20	J093319P
20		0,800	cos φ 0,7	0,25	1,52	0,60	380V FA 0,800A 5 x 20	L093321P
		1,000		0,11	0,45	0,46	380V FA 1,000A 5 x 20	F093270P
		1,250		0,26	1,1	0,36	380V FA 1,250A 5 x 20	M093322P
		1,600		0,39	1,6	0,42	380V FA 1,600A 5 x 20	N093323P
		2,000		0,81	3,3	0,37	380V FA 2,000A 5 x 20	P093324P
		2,500		1,44	5,8	0,34	380V FA 2,500A 5 x 20	M093345P
		3,150		2,46	10	0,33	380V FA 3,150A 5 x 20	N093346P
		4,000		4,6	18,7	0,31	380V FA 4,000A 5 x 20	P093347P

Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

5x20 FA Very fast acting

Caractéristiques temps courant
Time current characteristics





Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

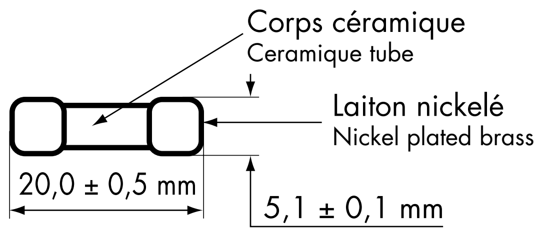
En blister de 50 pièces.
Blister per 50 pièces.

Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

5x20 SA Medium time lag

380 V ~ - SA
SEMI TEMPORISE (MEDIUM TIME LAG)
DE (FROM) 0,1A A (TO) 3,15A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 1,2 g
Max weight : 1,2 g

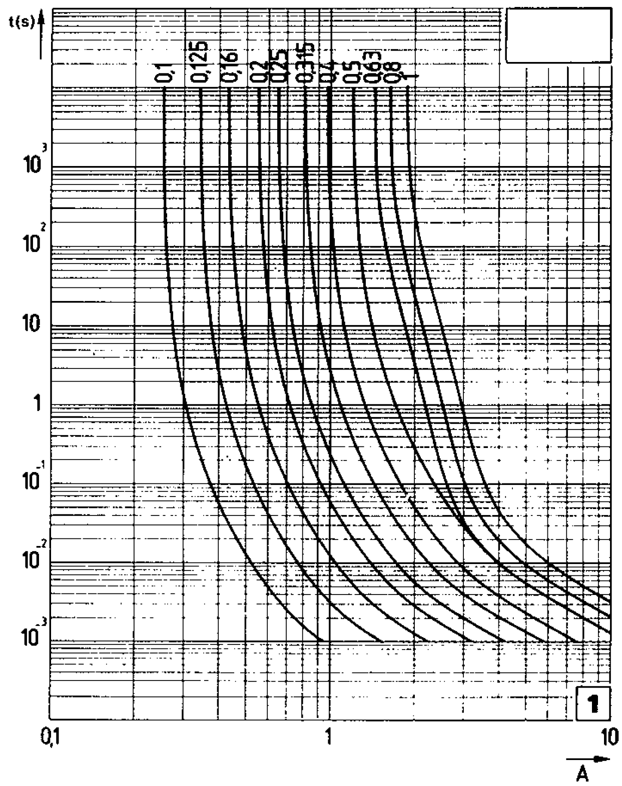
CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

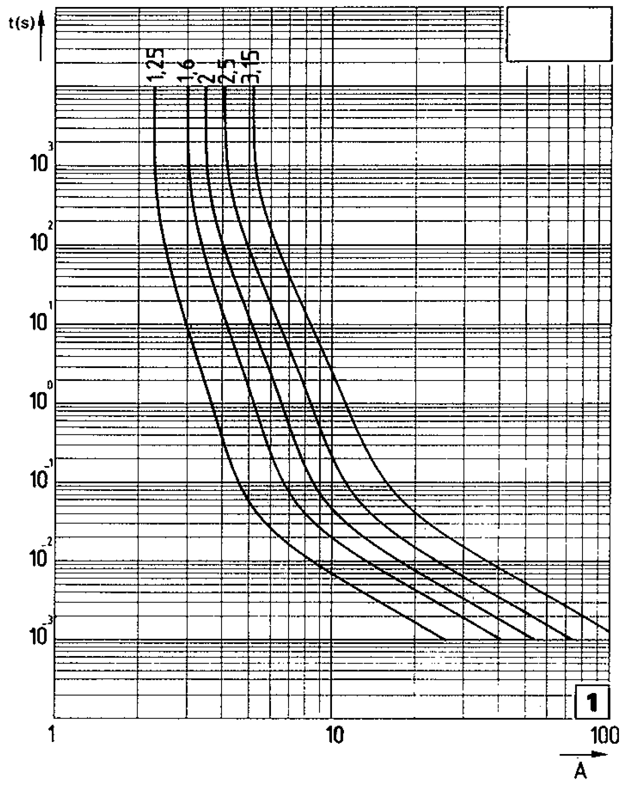
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 380V AC	[I^2t] mini de fusion Pre-arcing	[I^2t] total Total clearing at à Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A^2 s		V		50 pièces
		0,100		0,00077	0,0045	1,4	380V SA 0,100A 5 x 20	C095429P
		0,125		0,002	0,00123	1,1	380V SA 0,125A 5 x 20	T078930P
		0,160		0,0046	0,0275	0,9	380V SA 0,160A 5 x 20	Q095993P
		0,200		0,009	0,054	0,8	380V SA 0,200A 5 x 20	R095994P
		0,250		0,016	0,095	0,75	380V SA 0,250A 5 x 20	E095431P
		0,315		0,030	0,18	0,70	380V SA 0,315A 5 x 20	A095450P
		0,400		0,050	0,30	0,68	380V SA 0,400A 5 x 20	S095995P
5		0,500	380 V	0,12	0,73	0,55	380V SA 0,500A 5 x 20	E095477P
x	380	0,630	10 kA	0,11	0,45	0,26	380V SA 0,630A 5 x 20	T095996P
20		0,800	cos φ 0,7	0,17	0,71	0,26	380V SA 0,800A 5 x 20	G095479P
		1,000		0,26	1,1	0,26	380V SA 1,000A 5 x 20	J095481P
		1,250		0,55	2,25	0,20	380V SA 1,250A 5 x 20	Y095494P
		1,600		1,44	6	0,16	380V SA 1,600A 5 x 20	Z095495P
		2,000		2,46	10	0,15	380V SA 2,000A 5 x 20	A095496P
		2,500		4,6	20	0,14	380V SA 2,500A 5 x 20	B095497P
		3,150		11	45	0,11	380V SA 3,150A 5 x 20	C095498P

Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

5x20 SA Medium time lag

Caractéristiques temps courant
Time current characteristics





Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

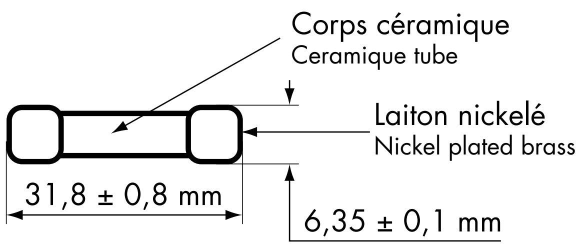
Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

6x32 FA Very fast acting

Homologations reconnues UL E 76491
Approvals UL recognized E 76491

125 V - 250 V ~ - FA
TRES RAPIDE (VERY FAST ACTING)
DE (FROM) 0,1A A (TO) 30A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

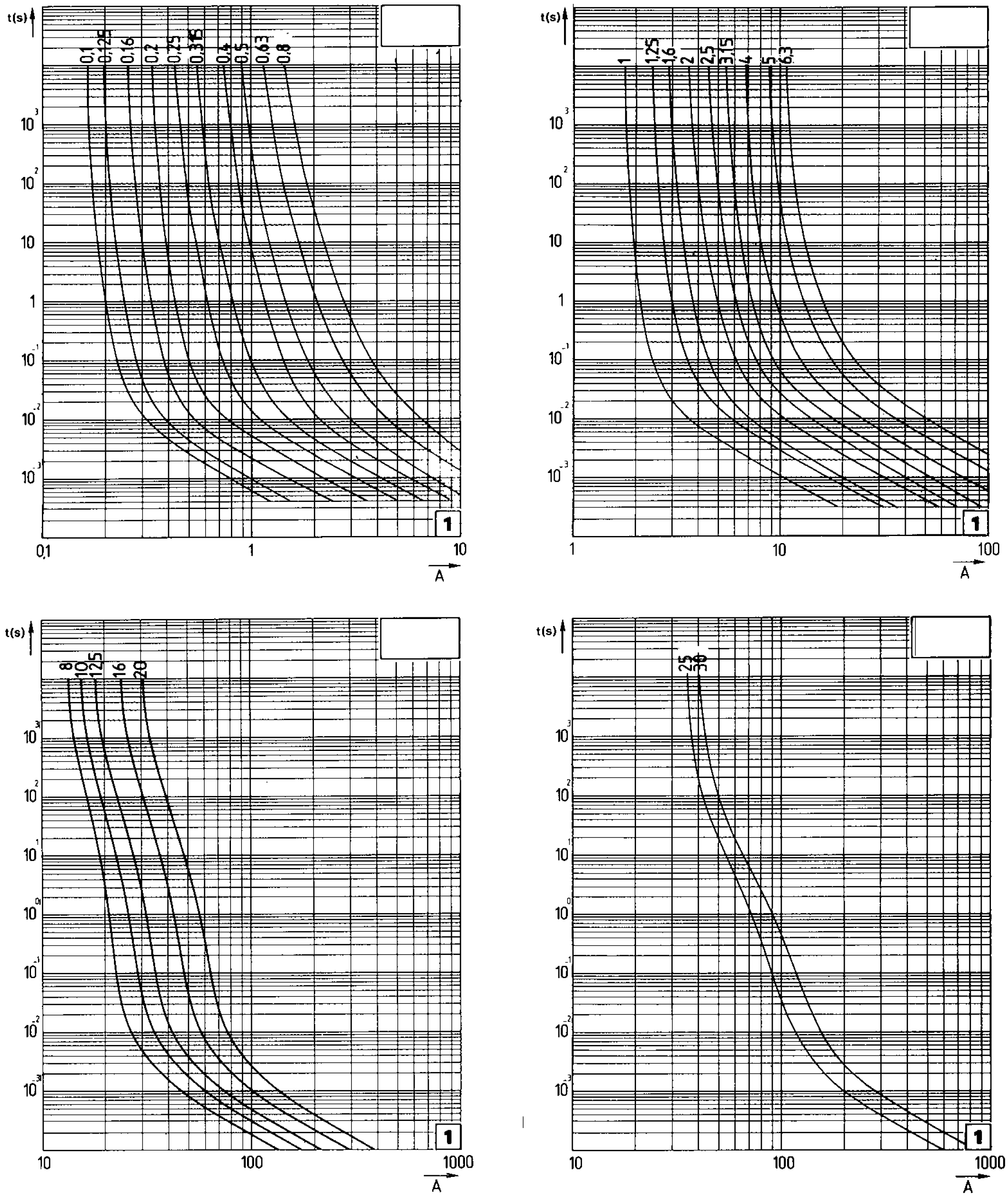
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A² s		V		50 pièces
6,3 x 32	250	0,100	200 kA 250 V cos φ 0,2	0,00057	0,0011	2,75	250 V FA 0,100A 6,3 x 32	R094315P
		0,125		0,00077	0,0015	2,60	250 V FA 0,125A 6,3 x 32	F084323P
		0,160		0,002	0,004	2	250 V FA 0,160A 6,3 x 32	G084301P
		0,200		0,0046	0,009	1,7	250 V FA 0,200A 6,3 x 32	C084320P
		0,250		0,009	0,018	1,55	250 V FA 0,250A 6,3 x 32	H084302P
		0,315		0,016	0,032	1,45	250 V FA 0,315A 6,3 x 32	D084321P
		0,400		0,03	0,06	1,4	250 V FA 0,400A 6,3 x 32	E084322P
		0,500		0,05	0,1	1,4	250 V FA 0,500A 6,3 x 32	J084303P
		0,630		0,12	0,24	1,15	250 V FA 0,630A 6,3 x 32	B084319P
		0,800		0,25	0,5	1	250 V FA 0,800A 6,3 x 32	G084324P
		1,000		0,11	0,2	0,71	250 V FA 1,000A 6,3 x 32	K084304P
		1,250		0,26	0,5	0,55	250 V FA 1,250A 6,3 x 32	L084305P
		1,600		0,39	0,7	0,65	250 V FA 1,600A 6,3 x 32	M084306P
		2,000		0,81	1,4	0,55	250 V FA 2,000A 6,3 x 32	N084307P
		2,500		1,44	2,5	0,52	250 V FA 2,500A 6,3 x 32	P084308P
		3,150		2,46	4,3	0,53	250 V FA 3,150A 6,3 x 32	Q084309P
		4,000		4,6	8	0,48	250 V FA 4,000A 6,3 x 32	R084310P
		5,000		11	20	0,37	250 V FA 5,000A 6,3 x 32	S084311P
		6,300		23	40	0,31	250 V FA 6,300A 6,3 x 32	T084312P
		8		1,5	25	0,19	250 V FA 8,000A 6,3 x 32	V084313P
		10		2,5	42	0,19	250 V FA 10,00A 6,3 x 32	W084314P
		12,5		3,8	60	0,2	250 V FA 12,50A 6,3 x 32	X084315P
		16		7,1	115	0,15	250 V FA 16,00A 6,3 x 32	Z084317P
		20		12,7	200	0,14	250 V FA 20,00A 6,3 x 32	A084318P
	125	25	100 kA 125 V cos φ 0,2	32,5	200	0,14	125 V FA 25,00A 6,3 x 32	H084325P
		30		61,5	400	0,12	125 V FA 30,00A 6,3 x 32	J084326P

Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

6x32

FA Very fast acting

Caractéristiques temps courant
Time current characteristics



Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

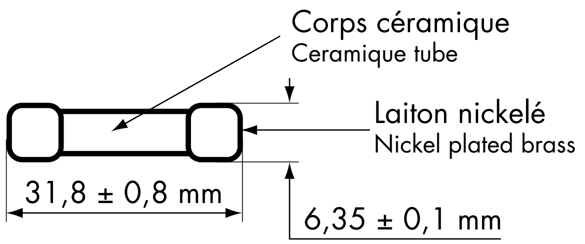
Semiconductor Fuses

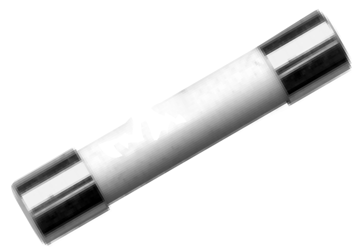
6x32 — SA Medium Time Lag

Homologations reconnues UL E 76491
Approvals UL recognized E 76491

125 V - 250 V ~ - SA
SEMI TEMPORISE (MEDIUM TIME LAG)
DE (FROM) 0,1A A (TO) 30A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A² s		V		50 pièces
6,3 x 32	250	0,100	200 kA 250 V cos φ 0,2	0,00077	0,0015	2	250 V SA 0,100A 6,3 x 32	Q084424P
		0,125		0,002	0,0025	1,5	250 V SA 0,125A 6,3 x 32	C086367P
		0,160		0,0046	0,009	1,3	250 V SA 0,160A 6,3 x 32	Q084401P
		0,200		0,009	0,018	1,2	250 V SA 0,200A 6,3 x 32	L084420P
		0,250		0,016	0,032	1,1	250 V SA 0,250A 6,3 x 32	R084402P
		0,315		0,03	0,06	1	250 V SA 0,315A 6,3 x 32	M084421P
		0,400		0,05	0,1	1	250 V SA 0,400A 6,3 x 32	N084422P
		0,500		0,12	0,24	0,8	250 V SA 0,500A 6,3 x 32	S084403P
		0,630		0,11	0,2	0,4	250 V SA 0,630A 6,3 x 32	K084419P
		0,800		0,17	0,31	0,4	250 V SA 0,800A 6,3 x 32	P084423P
		1,000		0,26	0,5	0,4	250 V SA 1,000A 6,3 x 32	T084404P
		1,250		0,55	1	0,35	250 V SA 1,250A 6,3 x 32	V084405P
		1,600		1,44	2,5	0,26	250 V SA 1,600A 6,3 x 32	W084406P
		2,000		2,46	4,3	0,25	250 V SA 2,000A 6,3 x 32	X084407P
		2,500		4,6	8	0,23	250 V SA 2,500A 6,3 x 32	Y084408P
		3,150		11	20	0,16	250 V SA 3,150A 6,3 x 32	Z084409P
		4,000		23	40	0,16	250 V SA 4,000A 6,3 x 32	A084410P
		5,000		15,7	70	0,13	250 V SA 5,000A 6,3 x 32	B084411P
		6,300		28	120	0,13	250 V SA 6,300A 6,3 x 32	C084412P
		8		52,9	230	0,12	250 V SA 8,000A 6,3 x 32	H093364P
		10		98,4	420	0,11	250 V SA 10,00A 6,3 x 32	E084414P
		12,5		141	410	0,12	250 V SA 12,50A 6,3 x 32	F084415P
		16		252	720	0,13	250 V SA 16,00A 6,3 x 32	H084417P
		20		252	720	0,12	250 V SA 20,00A 6,3 x 32	J084418P
	125	25	100 kA 125 V cos φ 0,2	700	1 500	0,09	125 V SA 25,00A 6,3 x 32	T084427P
		30		1 090	2 350	0,09	125 V SA 30,00A 6,3 x 32	V084428P

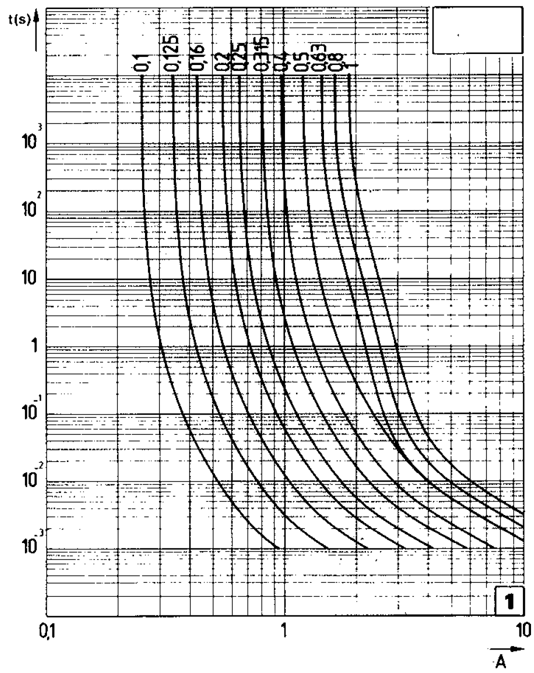
Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

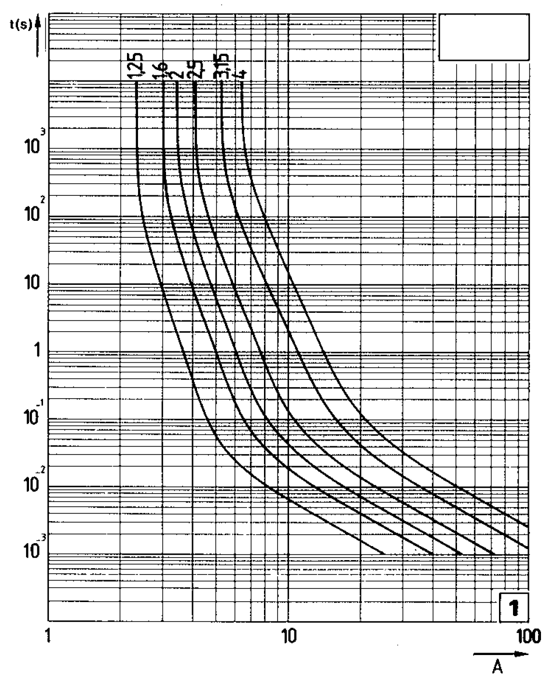
Miniature Fuses

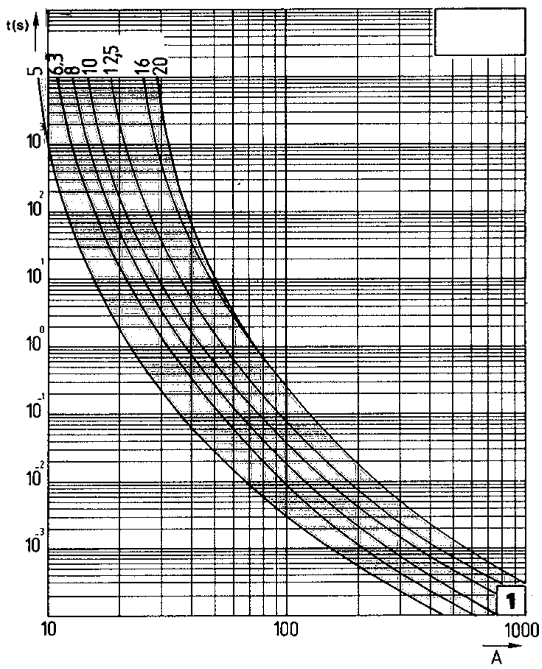
Semiconductor Fuses

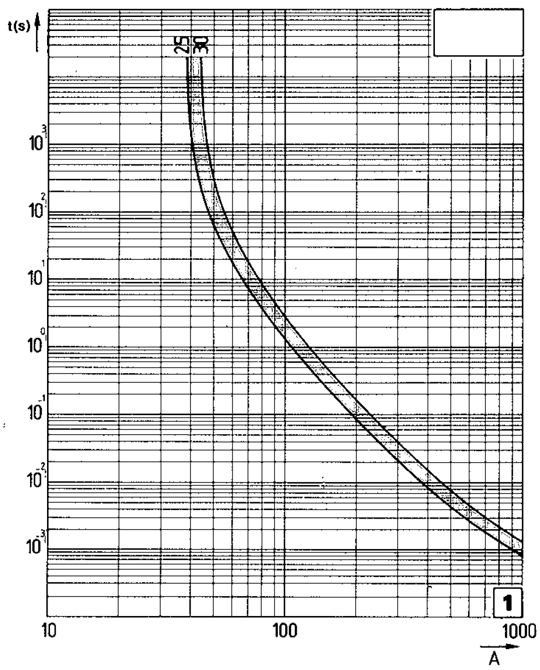
6x32 — SA Medium Time Lag

Caractéristiques temps courant
Time current characteristics









Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

Miniature Fuses

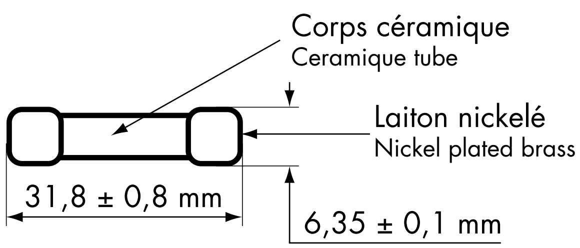
Semiconductor Fuses

6x32 — FA/FB Very fast acting

Homologations reconnues UL E 76491
Approvals UL recognized E 76491

380 V ~ - FA - FB
TRES RAPIDE (VERY FAST ACTING)
DE (FROM) 0,1A A (TO) 16A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

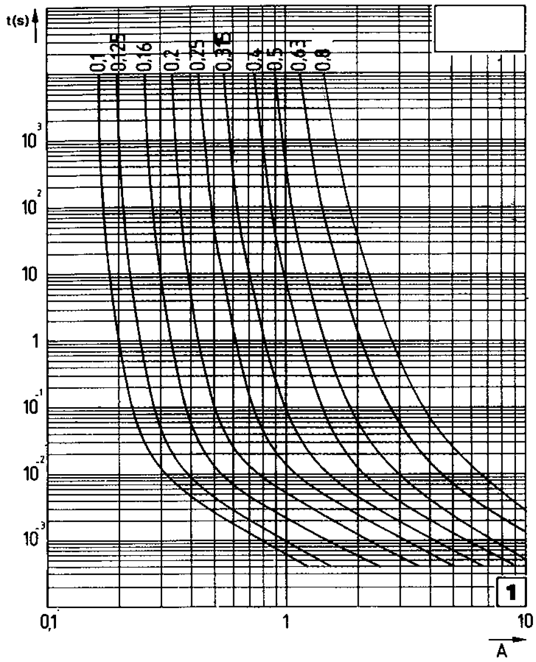
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A^2 s		V		50 pièces
6,3 x 32	380	0,100	200 kA 380 V cos φ 0,2	0,00057	0,0016	2,75	380 V FA 0,100A 6,3 x 32	H078920P
		0,125		0,00077	0,0021	2,60	380 V FA 0,125A 6,3 x 32	F084369P
		0,160		0,002	0,006	2	380 V FA 0,160A 6,3 x 32	M084352P
		0,200		0,0046	0,013	1,7	380 V FA 0,200A 6,3 x 32	G084370P
		0,250		0,009	0,025	1,55	380 V FA 0,250A 6,3 x 32	N084353P
		0,315		0,016	0,045	1,45	380 V FA 0,315A 6,3 x 32	D084367P
		0,400		0,03	0,085	1,4	380 V FA 0,400A 6,3 x 32	H084371P
		0,500		0,05	0,15	1,4	380 V FA 0,500A 6,3 x 32	P084354P
		0,630		0,12	0,35	1,15	380 V FA 0,630A 6,3 x 32	E084368P
		0,800		0,25	0,72	1	380 V FA 0,800A 6,3 x 32	L084351P
		1,000		0,11	0,25	0,71	380 V FA 1,000A 6,3 x 32	Q084355P
		1,250		0,26	0,6	0,55	380 V FA 1,250A 6,3 x 32	R084356P
		1,600		0,39	0,9	0,65	380 V FA 1,600A 6,3 x 32	S084357P
		2,000		0,81	1,9	0,55	380 V FA 2,000A 6,3 x 32	T084358P
		2,500		1,44	3,2	0,52	380 V FA 2,500A 6,3 x 32	V084359P
		3,150		2,46	5,5	0,53	380 V FA 3,150A 6,3 x 32	W084360P
		4,000		4,6	10	0,48	380 V FA 4,000A 6,3 x 32	X084361P
		5,000	150 kA 380 V cos φ 0,2	11	25	0,37	380 V FA 5,000A 6,3 x 32	Y084362P
		6,300		1,1	12	0,22	380 V FA 6,300A 6,3 x 32	Z084363P
		8		2	21	0,22	380 V FA 8,000A 6,3 x 32	A084364P
		10		3,1	35	0,20	380 V FA 10,00A 6,3 x 32	B084365P
		12,5		4,5	47	0,22	380 V FA 12,50A 6,3 x 32	C084366P
		16		5,3	55	0,29	380 V FB 16,00A 6,3 x 32	K084373P
		20				654	380 V FB 20,00A 6,3 x 32	H203350

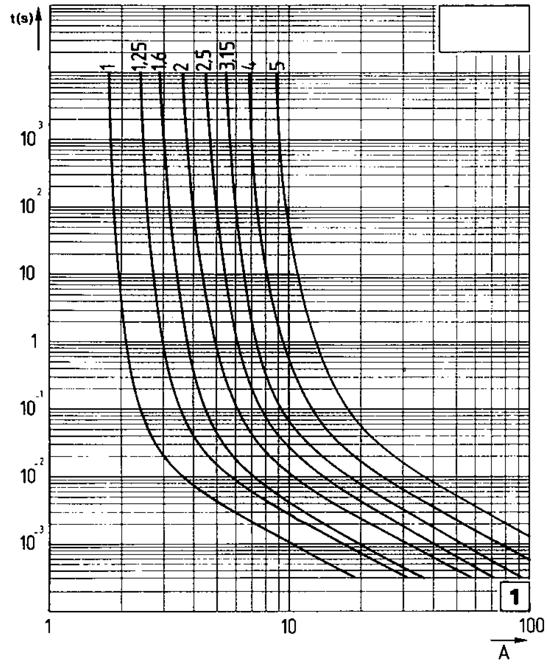
*Calibre non homologué *Ratin out of standards.
Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

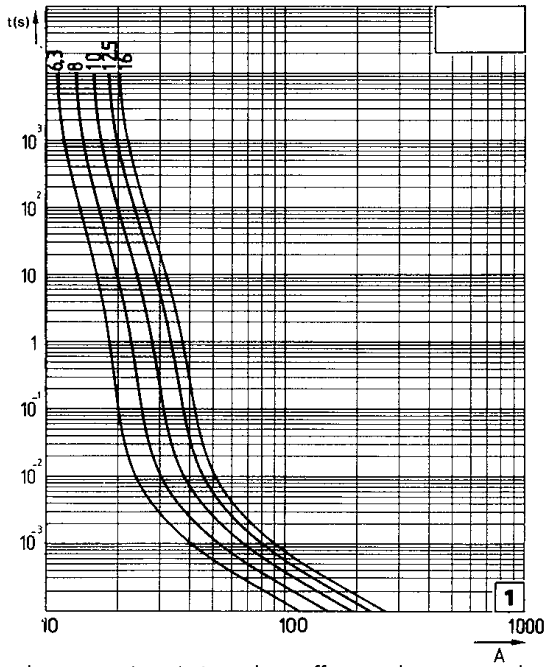
Semiconductor Fuses

6x32 FA/FB Very fast acting

Caractéristiques temps courant
Time current characteristics







Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

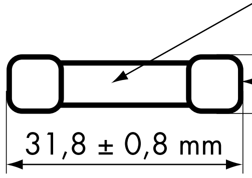
Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

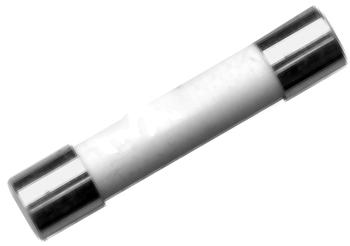
Semiconductor Fuses

6x32 SA Medium Time Lag

380 V ~ - SA
SEMI TEMPORISE (MEDIUM TIME LAG)
DE (FROM) 0,1A A (TO) 10A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

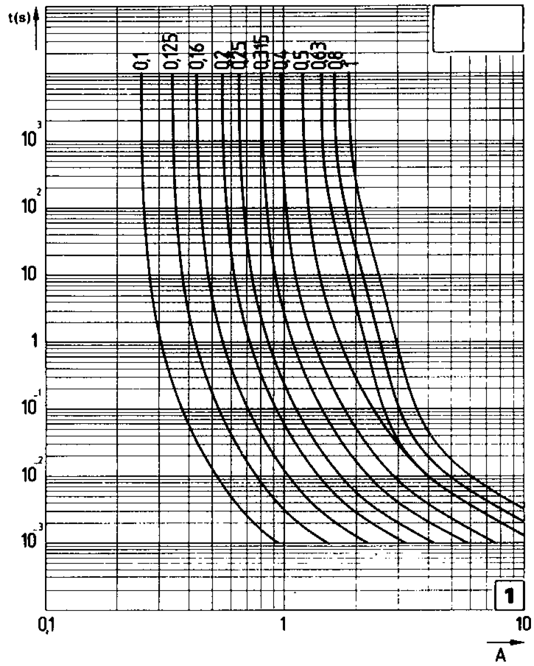
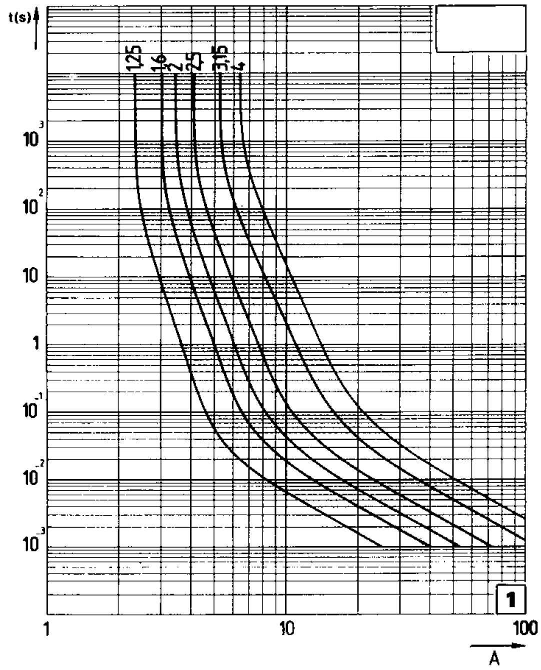
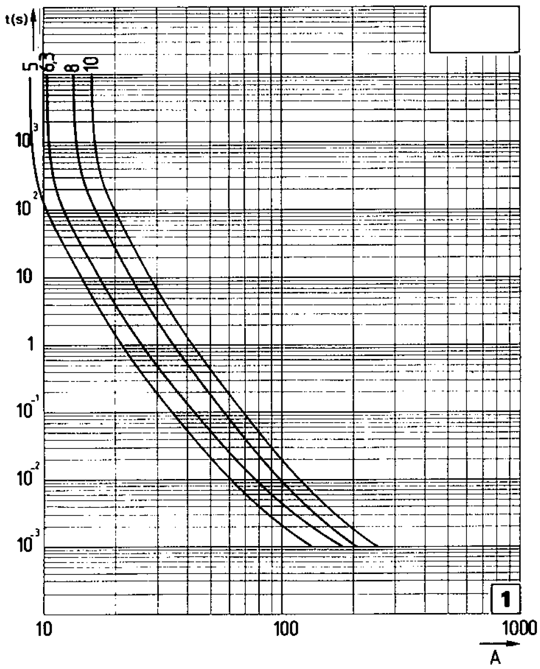
CARACTERISTIQUES PRINCIPALES
MAIN CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A² s		V		50 pièces
6,3 x 32	380	0,100	50 Ka 380 V cos φ 0,2	0,00077	0,0021	2	380 V SA 0,100A 6,3 x 32	M078901P
		0,125		0,002	0,0037	1,5	380 V SA 0,125A 6,3 x 32	N078902P
		0,160		0,0046	0,013	1,3	380 V SA 0,160A 6,3 x 32	P078903P
		0,20		0,009	0,025	1,2	380 V SA 0,200A 6,3 x 32	Q078904P
		0,25		0,016	0,045	1,1	380 V SA 0,250A 6,3 x 32	R078905P
		0,315		0,03	0,085	1	380 V SA 0,315A 6,3 x 32	S078906P
		0,40		0,05	0,15	1	380 V SA 0,400A 6,3 x 32	D094418P
		0,50		0,12	0,35	0,8	380 V SA 0,500A 6,3 x 32	T078907P
		0,63		0,11	0,25	0,4	380 V SA 0,630A 6,3 x 32	V078908P
		0,80		0,17	0,38	0,4	380 V SA 0,800A 6,3 x 32	W078909P
		1,00		0,26	0,60	0,4	380 V SA 1,000A 6,3 x 32	X078910P
		1,25		0,55	1,2	0,35	380 V SA 1,250A 6,3 x 32	Y078911P
		1,60		1,44	3,2	0,26	380 V SA 1,600A 6,3 x 32	S095029P
		2,00		2,46	5,5	0,25	380 V SA 2,000A 6,3 x 32	M078993P
		2,50		4,6	10	0,23	380 V SA 2,500A 6,3 x 32	Z078912P
		3,15		11	25	0,16	380 V SA 3,150A 6,3 x 32	M098244P
		4,0		23	50	0,16	380 V SA 4,000A 6,3 x 32	R098248P
		5,0		15,7	70	0,14	380 V SA 5,000A 6,3 x 32	S098249P
		6,3		28	120	0,14	380 V SA 6,300A 6,3 x 32	A099107P
		8		35,4	155	0,12	380 V SA 8,000A 6,3 x 32	C098258P
		10		52,9	230	0,12	380 V SA 10,00A 6,3 x 32	B095037P

Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

6x32 SA Medium Time Lag

Caractéristiques temps courant
Time current characteristics

Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

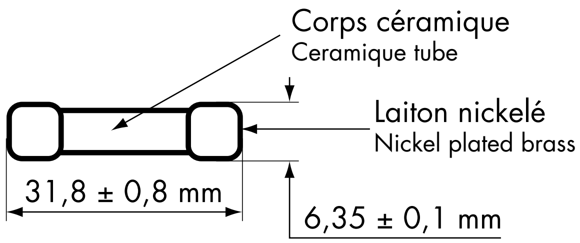
Ferraz Shawmut

Semiconductor Fuses

6x32 SA Medium time lag

500 V ~ - SA
SEMI TEMPORISE (MEDIUM TIME LAG)
DE (FROM) 0,1A A (TO) 10A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

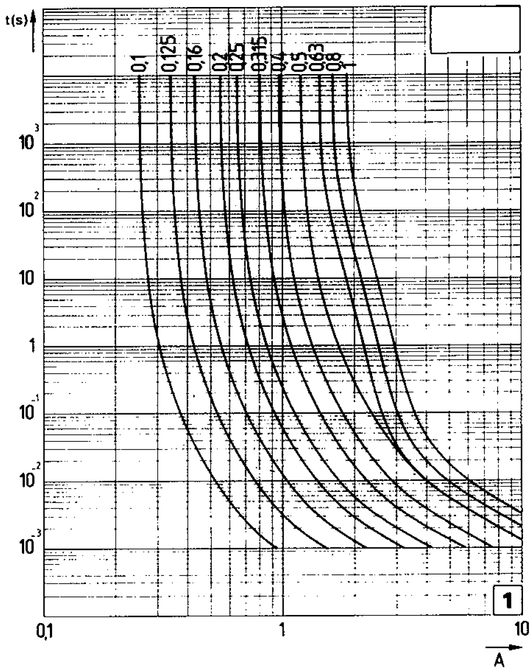
CARACTERISTIQUES PRINCIPALES
MAIN CHARACTERISTICS

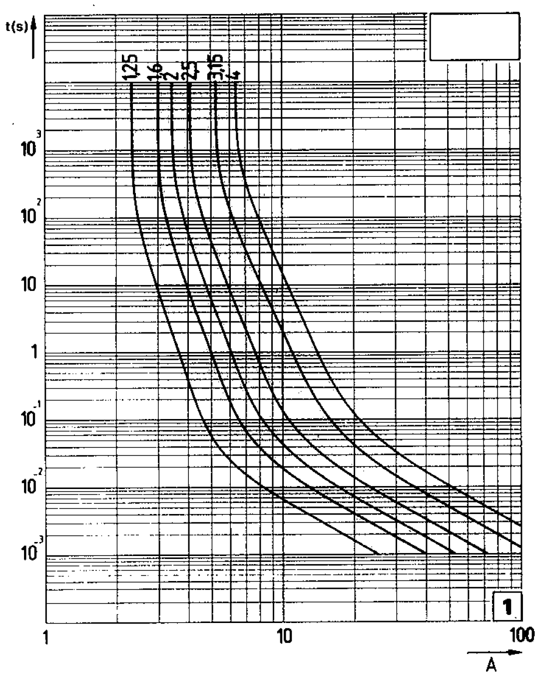
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A² s		V		50 pièces
6,3 x 32	500	0,100	50 kA 500 V cos φ 0,2	0,00077	0,003	2	500 V SA 0,100A 6,3 x 32	C078869P
		0,125		0,002	0,008	1,5	500 V SA 0,125A 6,3 x 32	C098120P
		0,160		0,0046	0,017	1,3	500 V SA 0,160A 6,3 x 32	D098121P
		0,20		0,009	0,035	1,2	500 V SA 0,200A 6,3 x 32	D078870P
		0,25		0,016	0,060	1,1	500 V SA 0,250A 6,3 x 32	E098122P
		0,315		0,03	0,11	1	500 V SA 0,315A 6,3 x 32	F098123P
		0,40		0,05	0,2	1	500 V SA 0,400A 6,3 x 32	G098124P
		0,50		0,12	0,45	0,8	500 V SA 0,500A 6,3 x 32	H098125P
		0,63		0,11	0,3	0,4	500 V SA 0,630A 6,3 x 32	J098126P
		0,80		0,17	0,5	0,4	500 V SA 0,800A 6,3 x 32	K098127P
		1,00		0,26	0,75	0,4	500 V SA 1,000A 6,3 x 32	L098128P
		1,25		0,55	1,5	0,35	500 V SA 1,250A 6,3 x 32	M098129P
		1,60		1,44	4	0,26	500 V SA 1,600A 6,3 x 32	N098130P
		2,00		2,46	7	0,25	500 V SA 2,000A 6,3 x 32	P098131P
		2,50	10 kA 500 V cos φ 0,2	4,6	14	0,23	500 V SA 2,500A 6,3 x 32	Y098208P
		3,15		11	30	0,16	500 V SA 3,150A 6,3 x 32	F085450P
		4,0		23	60	0,16	500 V SA 4,000A 6,3 x 32	G085451P
		5,0		15,7	80	0,14	500 V SA 5,000A 6,3 x 32	E085610P
		6,3		28	150	0,14	500 V SA 6,300A 6,3 x 32	F085611P
		8		35,4	180	0,12	500 V SA 8,000A 6,3 x 32	G085612P
		10		52,9	265	0,12	500 V SA 10,00A 6,3 x 32	H085613P

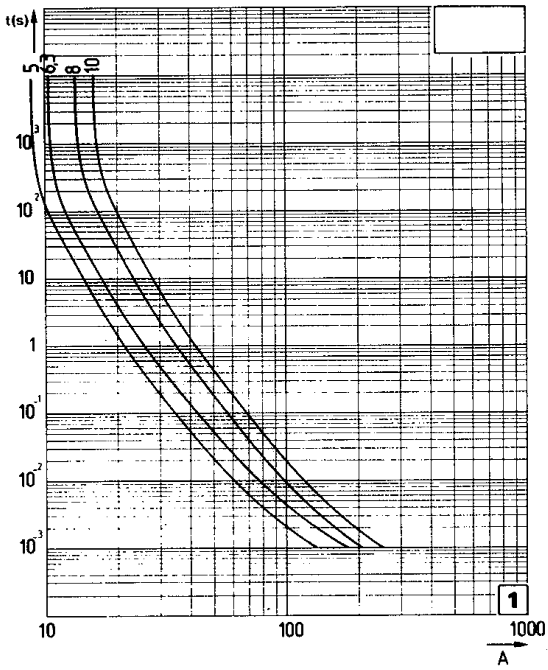
Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

6x32 — SA Medium time lag

Caractéristiques temps courant
Time current characteristics







Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

Miniature Fuses

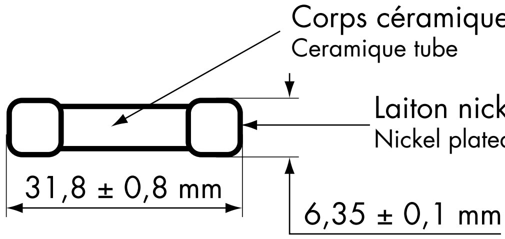
Semiconductor Fuses

6x32 FA Very fast acting

Homologations reconnues UL E 76491
Approvals UL recognized E 76491

500 V ~ - FA
TRES RAPIDE (VERY FAST ACTING)
DE (FROM) 0,1A A (TO) 16A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

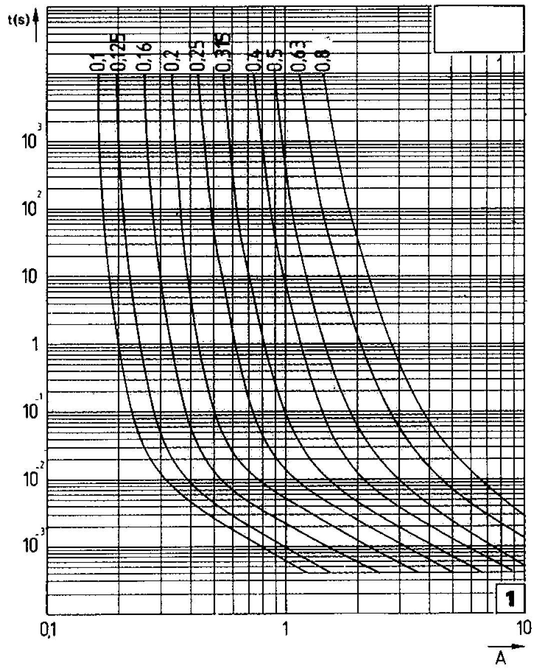
CARACTERISTIQUES PRINCIPALES
MAIN CHARACTERISTICS

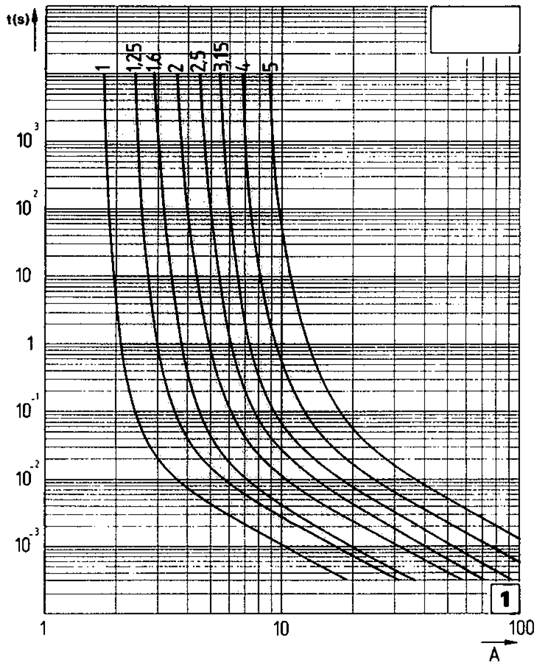
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
mm	V	A		A² s		V		50 pièces
6,3 x 32	500	0,100	200 kA 500 V cos φ 0,2	0,00057	0,002	2,75	500 V FA 0,100A 6,3 x 32	L080464P
		0,125		0,00077	0,003	2,60	500 V FA 0,125A 6,3 x 32	M084214P
		0,160		0,002	0,008	2	500 V FA 0,160A 6,3 x 32	Y084201P
		0,200		0,0046	0,017	1,7	500 V FA 0,200A 6,3 x 32	N084215P
		0,250		0,009	0,035	1,55	500 V FA 0,250A 6,3 x 32	Z084202P
		0,315		0,016	0,060	1,45	500 V FA 0,315A 6,3 x 32	A084203P
		0,400		0,03	0,11	1,4	500 V FA 0,400A 6,3 x 32	P084216P
		0,500		0,05	0,20	1,4	500 V FA 0,500A 6,3 x 32	B084204P
		0,630		0,12	0,45	1,15	500 V FA 0,630A 6,3 x 32	C084205P
		0,800		0,25	0,92	1	500 V FA 0,800A 6,3 x 32	L084213P
		1,000		0,11	0,30	0,71	500 V FA 1,000A 6,3 x 32	D084206P
		1,250		0,26	0,75	0,55	500 V FA 1,250A 6,3 x 32	E084207P
		1,600		0,39	1,1	0,65	500 V FA 1,600A 6,3 x 32	F084208P
		2,000		0,81	2,2	0,55	500 V FA 2,000A 6,3 x 32	G084209P
		2,500		1,44	4	0,52	500 V FA 2,500A 6,3 x 32	H084210P
		3,150		2,46	7	0,53	500 V FA 3,150A 6,3 x 32	X085442P
		4,000		4,6	14	0,48	500 V FA 4,000A 6,3 x 32	Y085443P
		5,000	20 kA 500 V cos φ 0,2	11	30	0,37	500 V FA 5,000A 6,3 x 32	Z085444P
		6,300		1,1	20	0,22	500 V FA 6,300A 6,3 x 32	A085445P
		8		2	35	0,22	500 V FA 8,000A 6,3 x 32	B085446P
		10		3,1	50	0,20	500 V FA 10,00A 6,3 x 32	C085447P
		12,5		4,5	75	0,22	500 V FA 12,50A 6,3 x 32	D085448P
		16		5,3	85	0,29	500 V FA 16,00A 6,3 x 32	E085449P

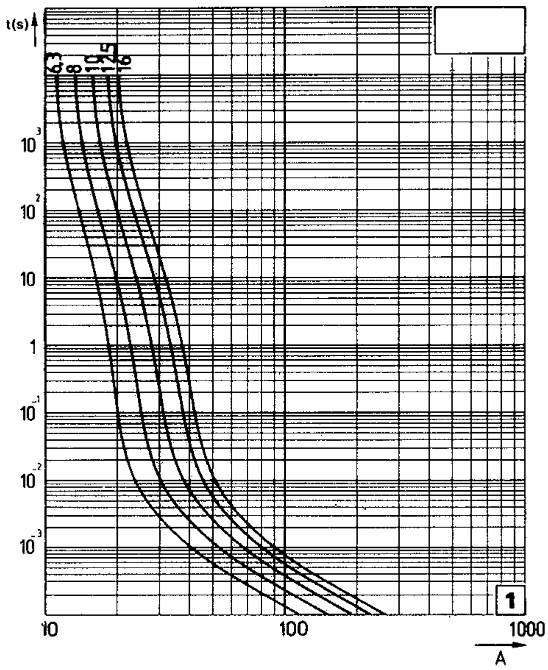
Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

6x32 FA Very fast acting

Caractéristiques temps courant
Time current characteristics







Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

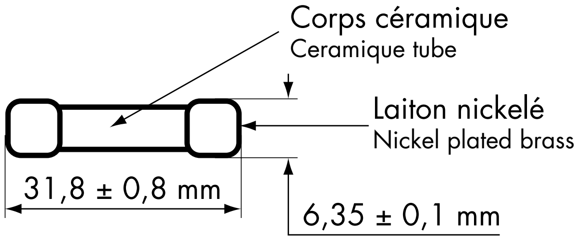
Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

6x32 — FA Very fast acting

660 V ~ - FA
TRES RAPIDE (VERY FAST ACTING)
DE (FROM) 0,1A A (TO) 2A
TAILLE (SIZE) : 6,3 x 32

Homologations reconnues UL E 76491
Approvals UL recognized E 76491

Dimensions
Dimensions





Fusibles ensablés
Fuses with filler

Poids maximum : 2,5 g
Max weight : 2,5 g

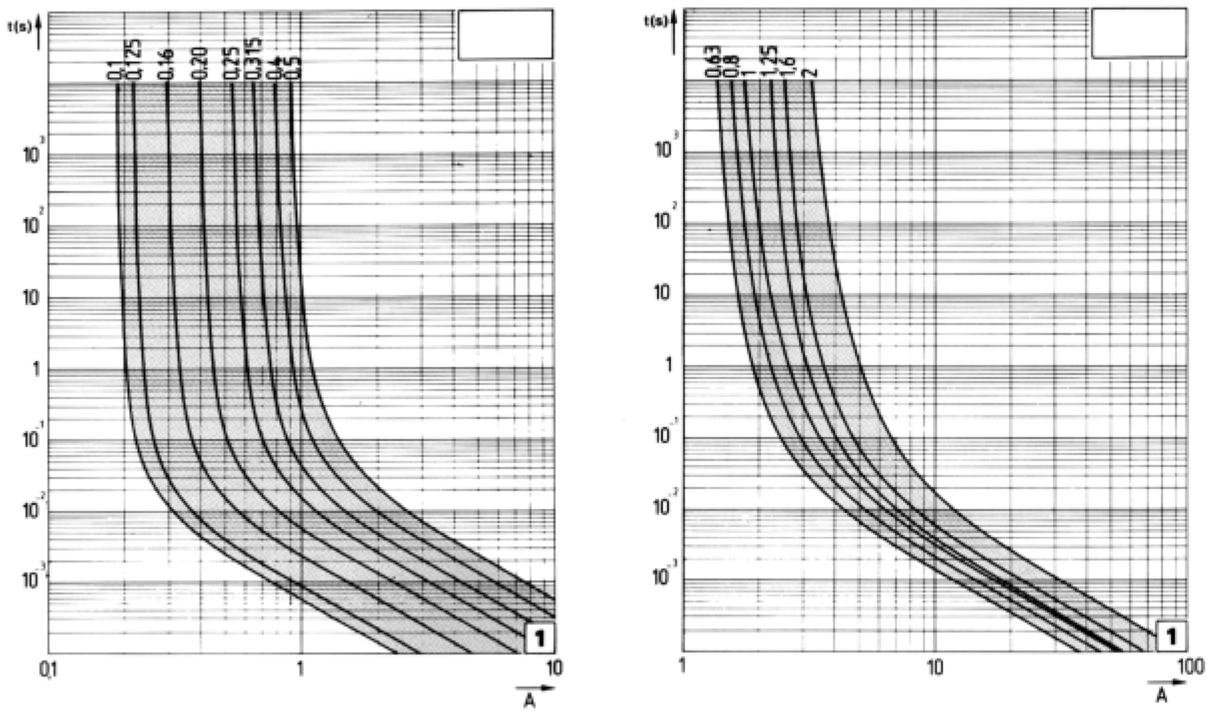
CARACTERISTIQUES PRINCIPALES
MAIN CHARACTERISTICS

Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under Un	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at Un	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en blister References in blister
V	A		A² s		V		50 pièces
	0,100		0,00057	0,0037	2,75	660 V FA 0,100A 6,3 x 32	Q 093 279 P
	0,125		0,00077	0,005	2,60	660 V FA 0,125A 6,3 x 32	S 093 281 P
	0,160		0,002	0,014	2	660 V FA 0,160A 6,3 x 32	V 086 452 P
	0,200		0,0046	0,030	1,7	660 V FA 0,200A 6,3 x 32	T 086 474 P
	0,250		0,009	0,060	1,55	660 V FA 0,250A 6,3 x 32	V 093 283 P
	0,315		0,016	0,10	1,45	660 V FA 0,315A 6,3 x 32	X 093 285 P
	0,400	30 kA	0,03	0,20	1,4	660 V FA 0,400A 6,3 x 32	W 086 476 P
	0,500	660 V	0,05	0,33	1,4	660 V FA 0,500A 6,3 x 32	D 086 483 P
	0,630	cosφ 0,2	0,12	0,8	1,15	660 V FA 0,630A 6,3 x 32	Z 093 287 P
	0,800		0,18	1,2	1,15	660 V FA 0,800A 6,3 x 32	D 086 437 P
	1,000		0,11	0,48	0,71	660 V FA 1,000A 6,3 x 32	H 093 295 P
	1,250		0,17	0,76	0,7	660 V FA 1,250A 6,3 x 32	B 093 289 P
	1,600		0,39	1,7	0,65	660 V FA 1,600A 6,3 x 32	D 093 291 P
	2,000		0,81	3,5	0,55	660 V FA 2,000A 6,3 x 32	F 093 293 P

Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

6x32 FA Very fast acting

Caractéristiques temps courant
Time current characteristics



Tolérance sur I ± 12 % t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time(s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En blister de 50 pièces.
Blister per 50 pieces.

Pour un conditionnement en boîte de 500 pièces nous consulter.
For a 500 pieces box packaging consult us.

Miniature Fuses

Semiconductor Fuses

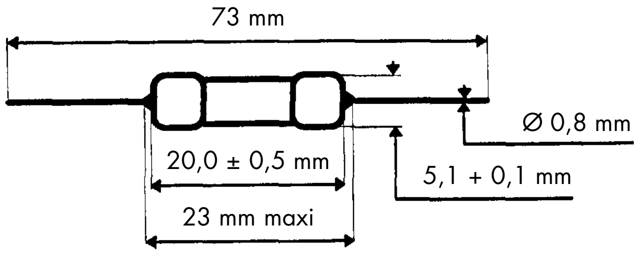
Axial leads 5x20

FC 'AL"Fast acting

Carcatéristiques électriques :
Conforme à la CEI 127-2 feuille 1
Electricals characteristics :
according to IEC 127-2 Standard Sheet 1

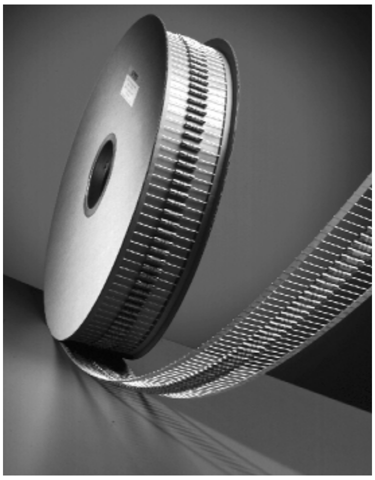
250 V ~ FC "AL"
RAPIDE (FAST ACTING)
DE (BETWEEN) 0,16A A (TO) 10A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions



Fusibles ensablés
Sand-filled fuses

Poids maximum : 1,5 g
Max weight : 1,5 g



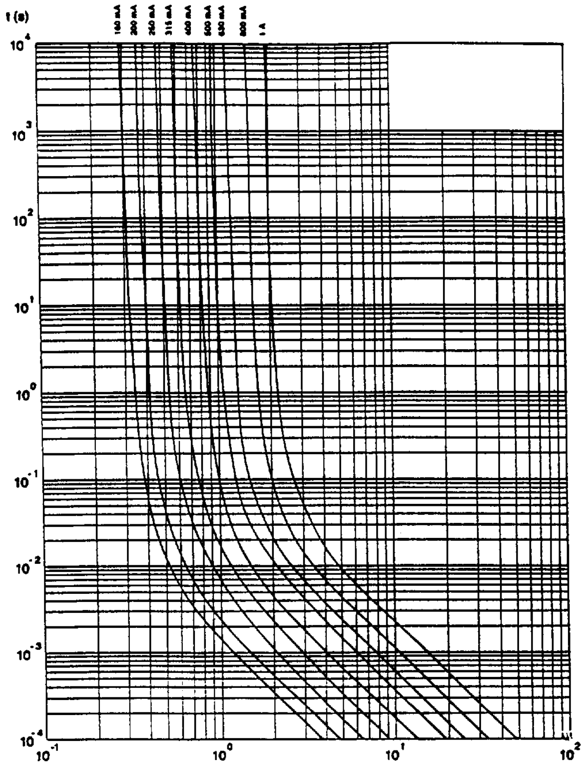
CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

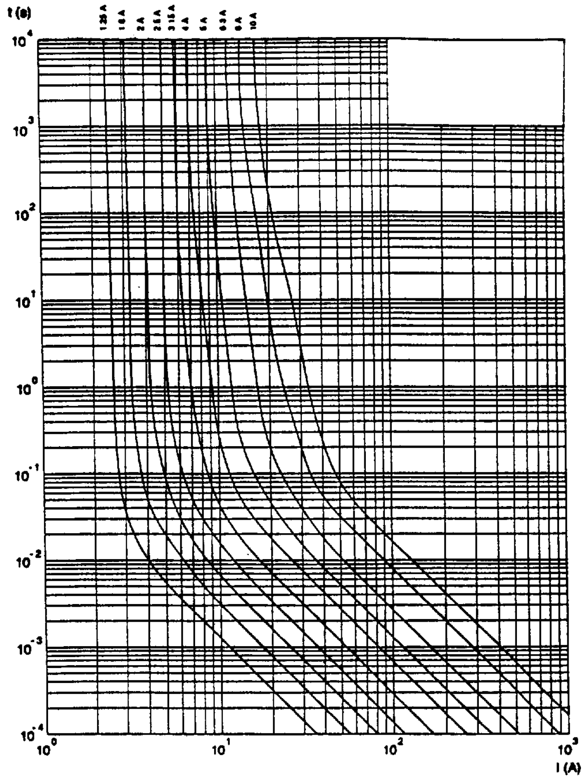
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 250V AC	$[I^2t]$ mini de fusion Pre-arcing	$[I^2t]$ total à Total clearing at 250 V	Chute maxi de tension à Max voltage drop at In	Désignation Code	Référence en bande de Part # in tape per
mm	V	A		A^2 s		V		2 000 pièces
5 x 20	250	0,160	Suivant CEI 127 1 500 A sous 250 V cos φ 0,7	0,0011	0,0025	1,6	250V FC 0,160 A 5x20 AL	L205032W
		0,200		0,0018	0,004	1,45	250V FC 0,200 A 5x20 AL	M205033W
		0,250		0,0035	0,008	1,3	250V FC 0,250 A 5x20 AL	N205034W
		0,315		0,0072	0,016	1,15	250V FC 0,315 A 5x20 AL	E206061W
		0,400		0,015	0,032	1,1	250V FC 0,400 A 5x20 AL	F206062W
		0,500		0,032	0,066	1	250V FC 0,500 A 5x20 AL	P205035W
		0,630		0,052	0,082	0,45	250V FC 0,630 A 5x20 AL	H206064W
		0,800		0,098	0,16	0,4	250V FC 0,800 A 5x20 AL	G206063W
		1,000		0,2	0,32	0,37	250V FC 1,000 A 5x20 AL	Q205036W
		1,250		0,11	0,35	0,55	250V FC 1,250 A 5x20 AL	R205037W
		1,600	Suivant CEI 269.1 et CEI 269.3 6 kA sous 250 V cos φ 0,2	0,28	0,55	0,42	250V FC 1,600 A 5x20 AL	S205038W
		2,000		0,55	1,2	0,38	250V FC 2,000 A 5x20 AL	T205039W
		2,500		1,1	2,4	0,34	250V FC 2,500 A 5x20 AL	V205040W
		3,150		2,5	5	0,28	250V FC 3,150 A 5x20 AL	W205041W
		4,000		6,1	12	0,23	250V FC 4,000 A 5x20 AL	X205042W
		5,000		11	22	0,21	250V FC 5,000 A 5x20 AL	Y205043W
		6,300		25	45	0,18	250V FC 6,300 A 5x20 AL	Z205044W
		8		72	130	0,13	250V FC 8,000 A 5x20 AL	A205045W
		10		150	270	0,11	250V FC 10,00 A 5x20 AL	B205046W

Ces fusibles ne peuvent pas être homologués SEMKO. La CEI 127 ne reconnaît pas des fusibles 5 x 20 avec des sorties filaires.
These fuses are not SEMKO approved. IEC 127 doesn't take into account 5x20 fuses with axial leads.

Axial leads 5x20 FC "AL" Fast acting

Caractéristiques temps courant
Time current characteristics

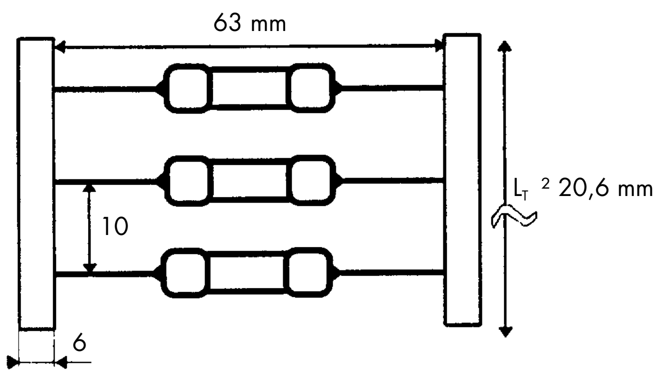


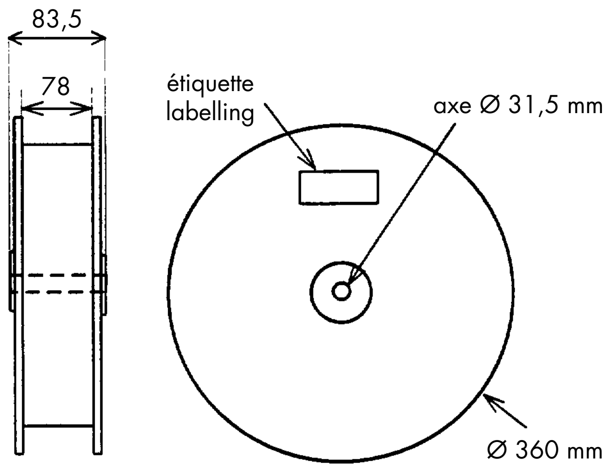


Tolérance sur I ± 12 %. t(s) : durée réelle de préarc (en s). I : valeur efficace du courant de préarc (en A).
I margin ± 12 %. Actuel prearcing time (s). R.M.S. Value of prearcing current (A).

Conditionnement
Packaging

En bande de 2 000 pièces.
In tape per 2 000 pieces.





Remarques concernant le montage
Installation instruction

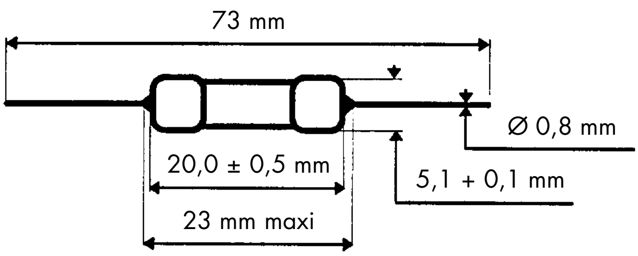
- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

Axial leads 5x20 FA "AL" Very fast acting

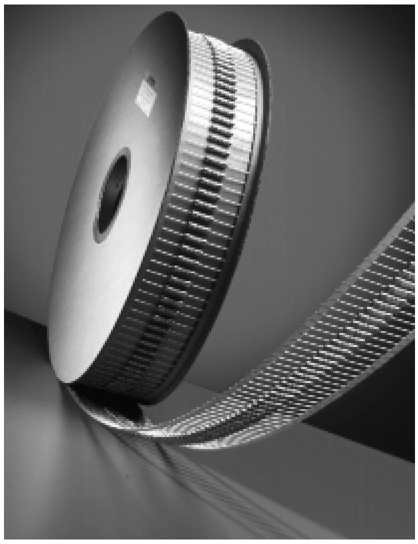
Homologations reconnues UL E 90660
Approvals UL recognized E 90660

250 V ~ FB/FA "AL"
TRÈS RAPIDE (VERY FAST ACTING)
DE (BETWEEN) 0,04A A (TO) 6,3 A
TAILLE (SIZE) : 5 x 20

Dimensions
Dimensions



Poids maximum : 1,5 g
Max weight : 1,5 g



CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

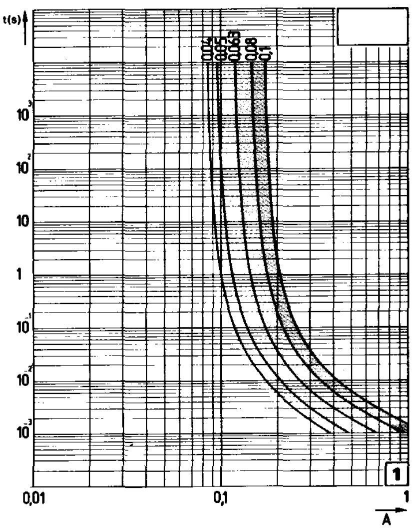
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 250V AC	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at 250 V	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en bande de References in tape per
mm	V	A		A² s		V		2 000 pièces
5 x 20	250	0,040*	4 kA cos φ 0,7	0,00013	0,0004	1,5	250V FB 0,040 A 5 x 20 AL	Z204883W
		0,050*		0,00020	0,0006	1,5	250V FB 0,050 A 5 x 20 AL	S206901W
		0,063*		0,00041	0,0012	1,3	250V FB 0,063 A 5 x 20 AL	K205031W
		0,080*		0,00077	0,0022	1,1	250V FB 0,080 A 5 x 20 AL	C207899W
		0,100*		0,00131	0,0037	1,1	250V FB 0,100 A 5 x 20 AL	B206472W
		0,125	30 kA cos φ 0,2 pour homologation for approvals Ic = 10 kA sous/under 250 V cos φ 0,7	0,00077	0,0021	1,7	250V FA 0,125 A 5 x 20 AL	M205907W
		0,160		0,0020	0,006	1,3	250V FA 0,160 A 5 x 20 AL	H208249W
		0,200		0,0046	0,013	1,1	250V FA 0,200 A 5 x 20 AL	J208250W
		0,250		0,009	0,025	1,0	250V FA 0,250 A 5 x 20 AL	L205906W
		0,315		0,016	0,045	0,90	250V FA 0,315 A 5 x 20 AL	K208251W
		0,400		0,03	0,085	0,85	250V FA 0,400 A 5 x 20 AL	L208252W
		0,500		0,05	0,15	0,80	250V FA 0,500 A 5 x 20 AL	M208253W
		0,630		0,12	0,35	0,70	250V FA 0,630 A 5 x 20 AL	N208254W
		0,800		0,25	0,72	0,60	250V FA 0,800 A 5 x 20 AL	P208255W
		1,000		0,11	0,25	0,46	250V FA 1,000 A 5 x 20 AL	Q208256W
		1,250		0,26	0,65	0,36	250V FA 1,250 A 5 x 20 AL	R208257W
		1,600		0,39	0,9	0,42	250V FA 1,600 A 5 x 20 AL	S208258W
		2,000		0,81	1,9	0,37	250V FA 2,000 A 5 x 20 AL	T208259W
		2,500		1,44	3,2	0,34	250V FA 2,500 A 5 x 20 AL	V208260W
		3,150		2,46	5,5	0,33	250V FA 3,150 A 5 x 20 AL	W208261W
		4,000		4,6	10	0,31	250V FA 4,000 A 5 x 20 AL	X208262W
		5,000		11	25	0,24	250V FA 5,000 A 5 x 20 AL	Y208263W
		6,300		23	50	0,20	250V FA 6,300 A 5 x 20 AL	Y208033W

* Calibre non homologué   * Rating no approval

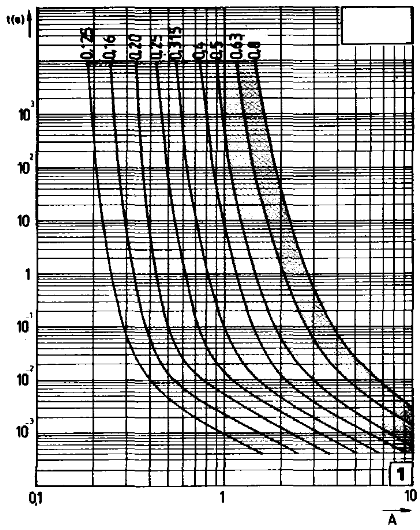
Axial leads 5x20 FB/FA "AL" Very fast acting

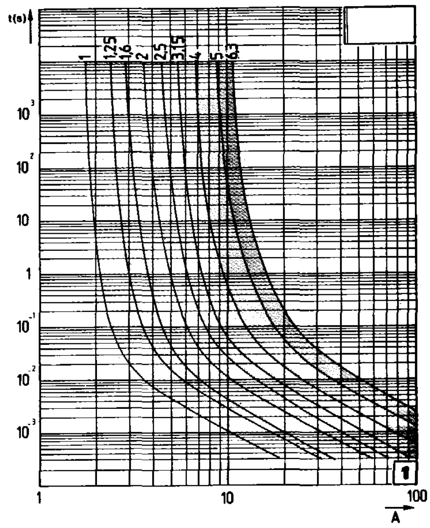
Caractéristiques temps courant
Time current characteristics

250 V FB 5 x 20



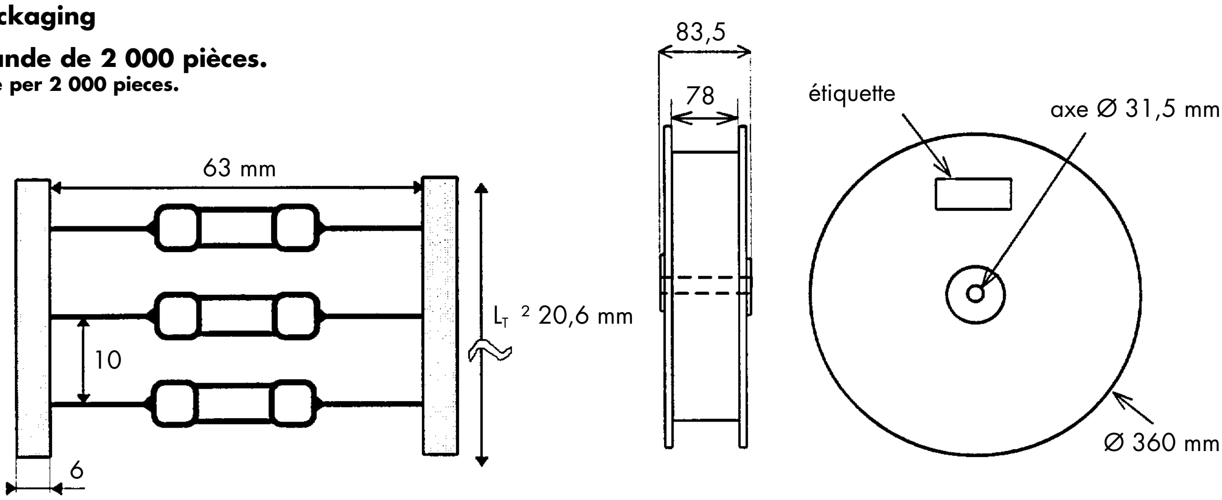
250 V FA 5 x 20





Conditionnement
Packaging

En bande de 2 000 pièces.
In tape per 2 000 pieces.



Remarques concernant le montage
Installation instruction

- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

Miniature Fuses

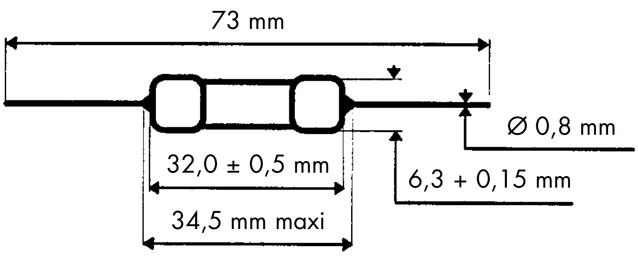
Semiconductor Fuses

Axial leads 6x32 FA "AL" Very fast acting

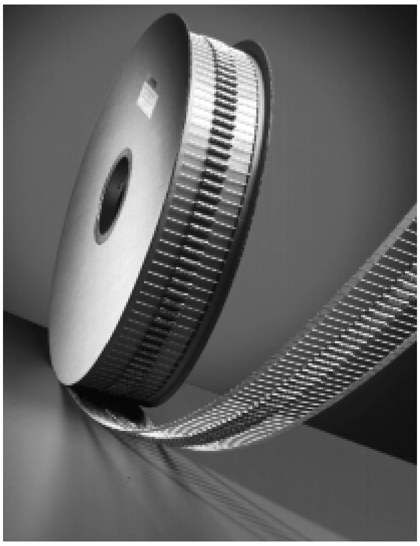
Homologations reconnues UL E 76491
Approvals UL recognized E 76491

250 V ~ FA "AL"
TRÈS RAPIDE (VERY FAST ACTING)
DE (BETWEEN) 0,1A A (TO) 6,3 A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions



Poids maximum : 2,5 g
Max weight : 2,5 g



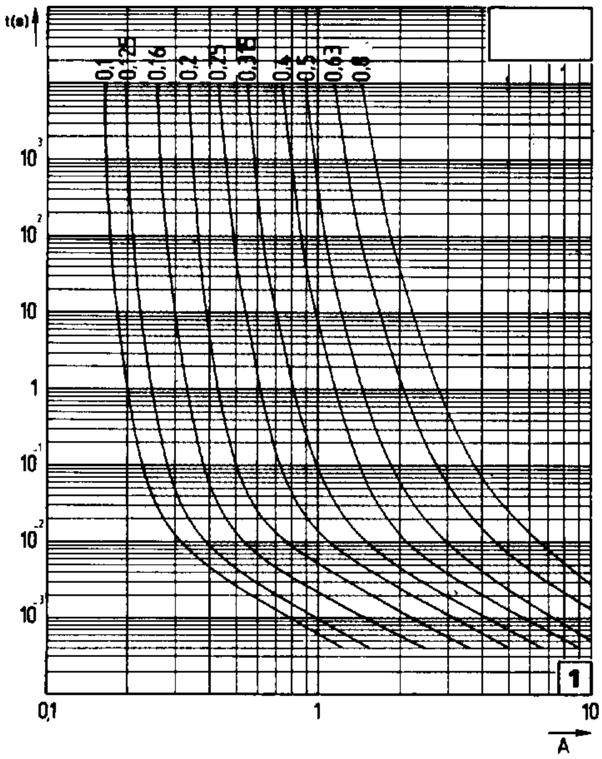
CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 250V AC	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at 250 V	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en bande de References in tape per
mm	V	A		A² s		V		1 500 pièces
		0,100		0,00057	0,0011	2,75	250V FA 0,100 A 6.32 AL	M208138V
		0,125		0,00077	0,0015	2,6	250V FA 0,125 A 6.32 AL	N208139V
		0,160		0,0020	0,004	2,0	250V FA 0,160 A 6.32 AL	P208140V
		0,200		0,0046	0,009	1,7	250V FA 0,200 A 6.32 AL	Q208141V
		0,250		0,009	0,018	1,55	250V FA 0,250 A 6.32 AL	R208142V
		0,315		0,016	0,032	1,45	250V FA 0,315 A 6.32 AL	S208143V
		0,400		0,03	0,06	1,40	250V FA 0,400 A 6.32 AL	T208144V
6,3		0,500	200 kA	0,05	0,10	1,40	250V FA 0,500 A 6.32 AL	V208145V
x	250	0,630	cos φ	0,12	0,24	1,15	250V FA 0,630 A 6.32 AL	W208146V
32		0,800	0,2	0,25	0,50	1,00	250V FA 0,800 A 6.32 AL	X208147V
		1,000		0,11	0,20	0,71	250V FA 1,000 A 6.32 AL	Y208148V
		1,250		0,26	0,50	0,55	250V FA 1,250 A 6.32 AL	Z208149V
		1,600		0,39	0,7	0,65	250V FA 1,600 A 6.32 AL	C208152V
		2,000		0,81	1,4	0,55	250V FA 2,000 A 6.32 AL	D208153V
		2,500		1,44	2,5	0,52	250V FA 2,500 A 6.32 AL	E208154V
		3,150		2,46	4,3	0,53	250V FA 3,150 A 6.32 AL	F208155V
		4,000		4,6	8	0,48	250V FA 4,000 A 6.32 AL	G208156V
		5,000		11	20	0,37	250V FA 5,000 A 6.32 AL	H208157V
		6,300		23	40	0,31	250V FA 6,300 A 6.32 AL	Z208034V

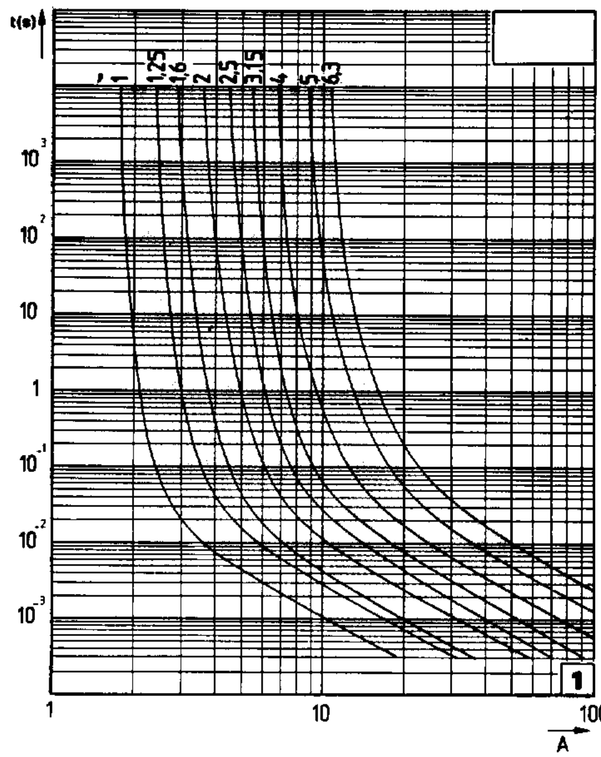
Axial leads 6x32 FA "AL" Very fast acting

Caractéristiques temps courant
Time current characteristics

250 V FA 6,3 x 32

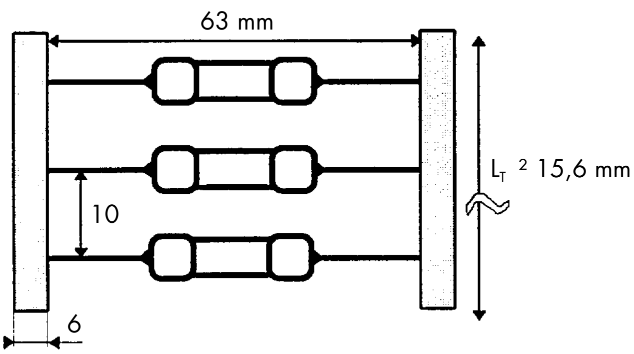


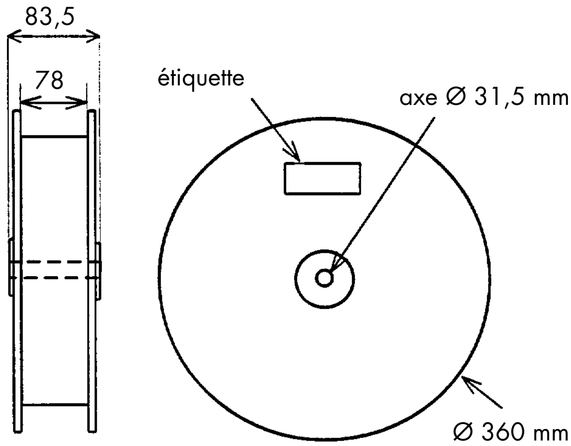
250 V FA 6,3 x 32



Conditionnement
Packaging

En bande de 1 500 pièces.
In tape per 1 500 pieces.





Remarques concernant le montage
Installation instruction

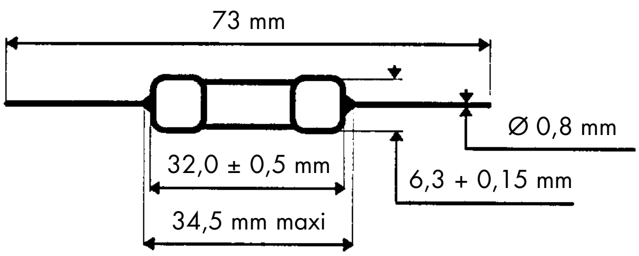
- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

Axial leads 6x32 SA "AL" Medium time lag

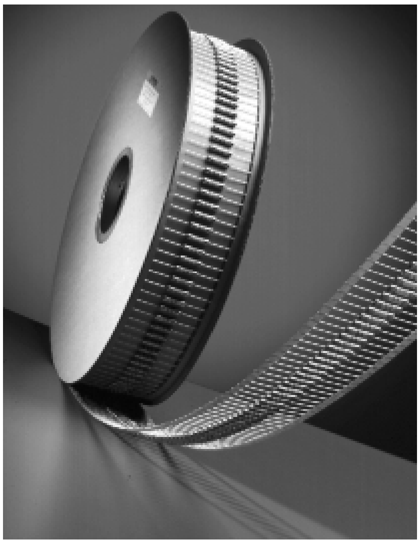
Homologations reconnues UL E 76491
Approvals UL recognized E 76491

250 V ~ SA "AL"
SEMI-TEMPORISÉ (MEDIUM TIME LAG)
DE (BETWEEN) 0,1A A (TO) 6,3 A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions



Poids maximum : 2,8 g
Max weight : 2,8 g



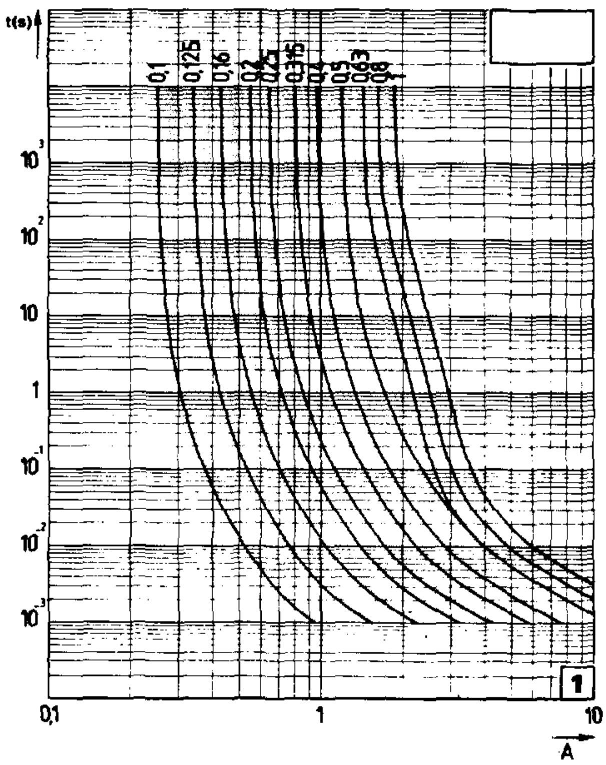
CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 250V AC	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at 250 V	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en bande de References in tape per
mm	V	A		A^2 s		V		1 500 pièces
6,3 x 32	250	0,100	200 kA cos φ 0,2	0,00077	0,0015	2,0	250V SA 0,100 A 6.32 AL	N208231V
		0,125		0,002	0,0025	1,5	250V SA 0,125 A 6.32 AL	P208232V
		0,160		0,0046	0,009	1,3	250V SA 0,160 A 6.32 AL	Q208233V
		0,200		0,009	0,018	1,2	250V SA 0,200 A 6.32 AL	R208234V
		0,250		0,016	0,032	1,1	250V SA 0,250 A 6.32 AL	S208235V
		0,315		0,03	0,06	1,0	250V SA 0,315 A 6.32 AL	T208236V
		0,400		0,05	0,10	1,0	250V SA 0,400 A 6.32 AL	V208237V
		0,500		0,12	0,24	0,80	250V SA 0,500 A 6.32 AL	W208238V
		0,630		0,11	0,20	0,40	250V SA 0,630 A 6.32 AL	X208239V
		0,800		0,17	0,31	0,40	250V SA 0,800 A 6.32 AL	Y208240V
		1,000		0,26	0,50	0,40	250V SA 1,000 A 6.32 AL	Z208241V
		1,250		0,55	1,0	0,35	250V SA 1,250 A 6.32 AL	A208242V
		1,600		1,44	2,5	0,26	250V SA 1,600 A 6.32 AL	B208243V
		2,000		2,46	4,3	0,25	250V SA 2,000 A 6.32 AL	C208244V
		2,500		4,6	8	0,23	250V SA 2,500 A 6.32 AL	D208245V
		3,150		11	20	0,16	250V SA 3,150 A 6.32 AL	E208246V
		4,000		23	40	0,16	250V SA 4,000 A 6.32 AL	F208247V
		5,000		15,7	70	0,13	250V SA 5,000 A 6.32 AL	G208248V
		6,300		28	120	0,13	250V SA 6,300 A 6.32 AL	E208039V

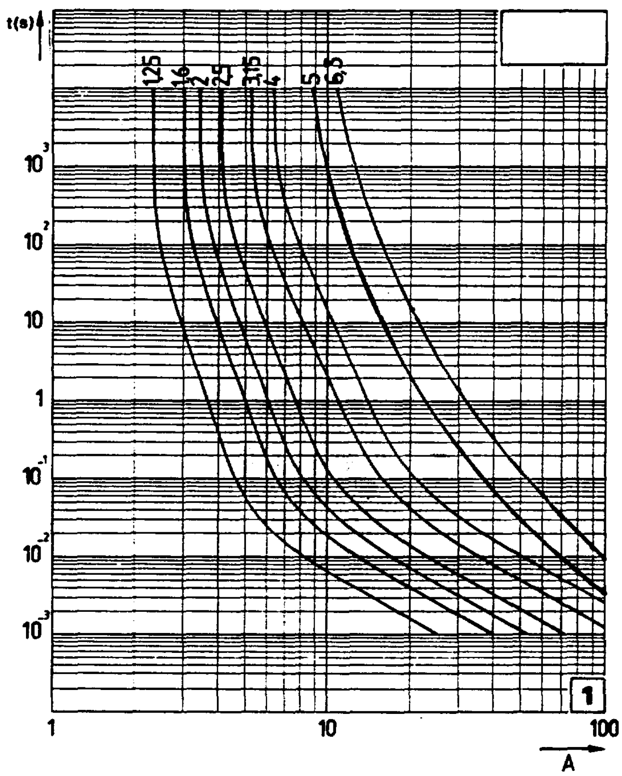
Axial leads 6x32 SA "AL" Medium time lag

Caractéristiques temps courant
Time current characteristics

250 V SA 6,3 x 32

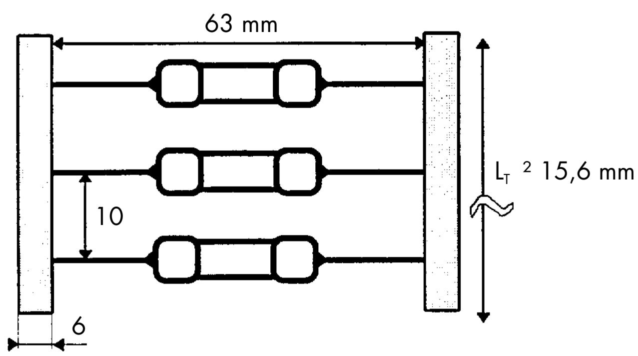


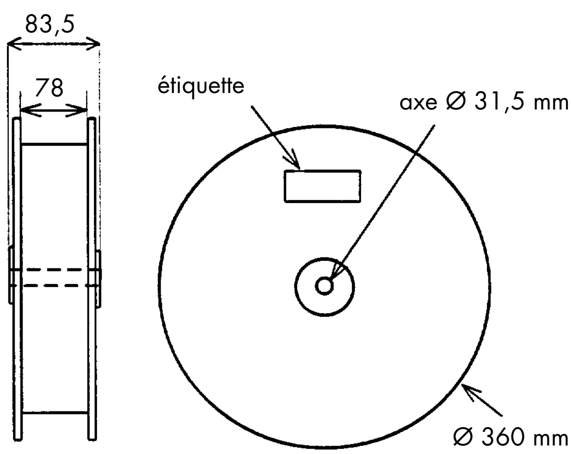
250 V SA 6,3 x 32



Conditionnement
Packaging

En bande de 1 500 pièces.
In tape per 1 500 pieces.





Remarques concernant le montage
Installation instruction

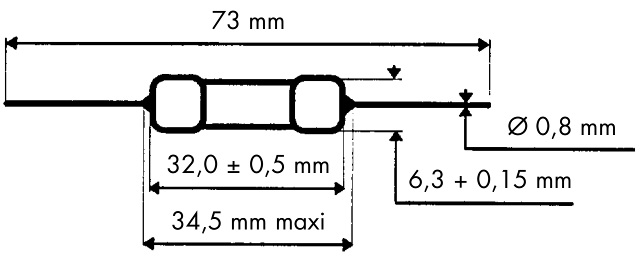
- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

Axial leads 6x32 380V FA "AL" Very fast acting

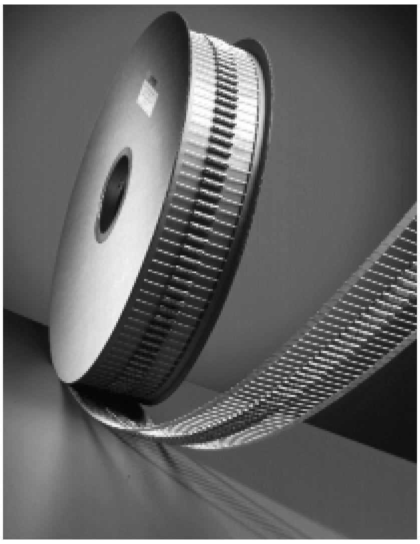
Homologations reconnues UL E 76491
Approvals UL recognized E 76491

380 V ~ FA "AL"
TRÈS RAPIDE (VERY FAST ACTING)
DE (BETWEEN) 0,1A A (TO 6,3 A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions



Poids maximum : 2,8 g
Max weight : 2,8 g



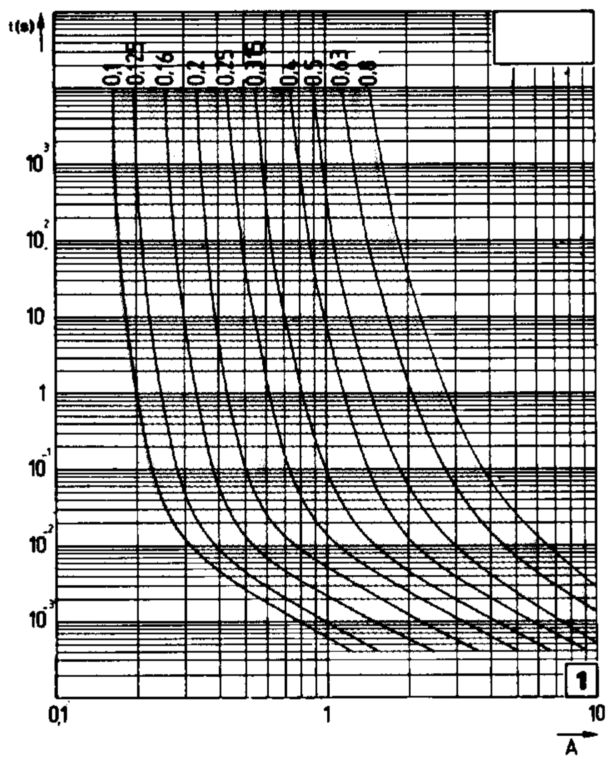
CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 380V AC	$[I^2t]$ mini de fusion Pre-arcing	$[I^2t]$ total à Total clearing at 400 V	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en bande de References in tape per
mm	V	A		A^2 s		V		1 500 pièces
6,3 x 32	380	0,100	200 kA cos φ 0,2	0,00057	0,0016	2,75	380V FA 0,100 A 6.32 AL	E208177V
		0,125		0,00077	0,0021	2,6	380V FA 0,125 A 6.32 AL	F208178V
		0,160		0,002	0,006	2,0	380V FA 0,160 A 6.32 AL	G208179V
		0,200		0,0046	0,013	1,7	380V FA 0,200 A 6.32 AL	H208180V
		0,250		0,009	0,025	1,55	380V FA 0,250 A 6.32 AL	J208181V
		0,315		0,016	0,045	1,45	380V FA 0,315 A 6.32 AL	K208182V
		0,400		0,03	0,085	1,40	380V FA 0,400 A 6.32 AL	L208183V
		0,500		0,05	0,15	1,40	380V FA 0,500 A 6.32 AL	M208184V
		0,630		0,12	0,35	1,15	380V FA 0,630 A 6.32 AL	N208185V
		0,800		0,25	0,72	1,0	380V FA 0,800 A 6.32 AL	P208186V
		1,000		0,11	0,25	0,71	380V FA 1,000 A 6.32 AL	Q208187V
		1,250		0,26	0,6	0,55	380V FA 1,250 A 6.32 AL	R208188V
		1,600		0,39	0,9	0,65	380V FA 1,600 A 6.32 AL	S208189V
		2,000		0,81	1,9	0,55	380V FA 2,000 A 6.32 AL	T208190V
		2,500		1,44	3,2	0,52	380V FA 2,500 A 6.32 AL	V208191V
		3,150		2,46	5,5	0,53	380V FA 3,150 A 6.32 AL	W208192V
		4,000		4,6	10	0,48	380V FA 4,000 A 6.32 AL	X208193V
		5,000	180 kA	11	25	0,37	380V FA 5,000 A 6.32 AL	Y208194V
		6,300	cos φ 0,2	1,1	12	0,22	380V FA 6,300 A 6.32 AL	A208035V

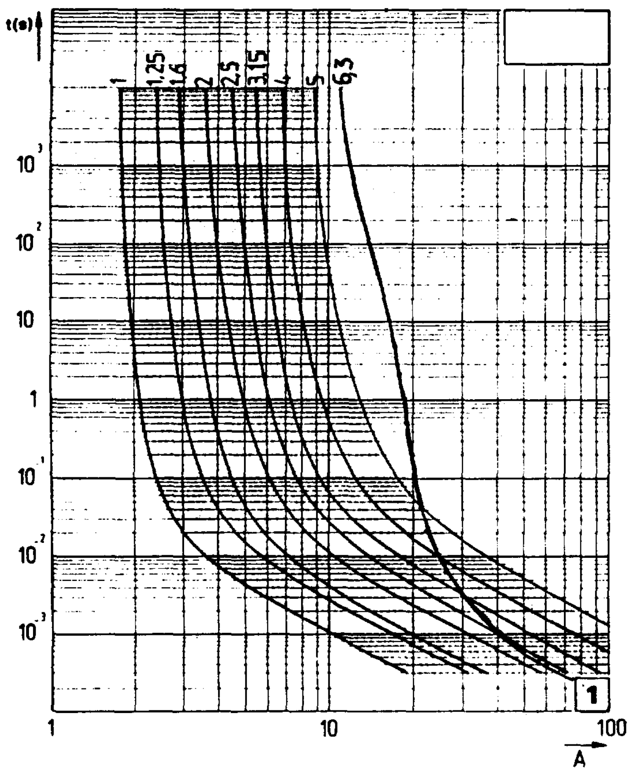
Axial leads 6x32 380V FA "AL" Very fast acting

Caractéristiques temps courant
Time current characteristics

380 V FA 6,3 x 32

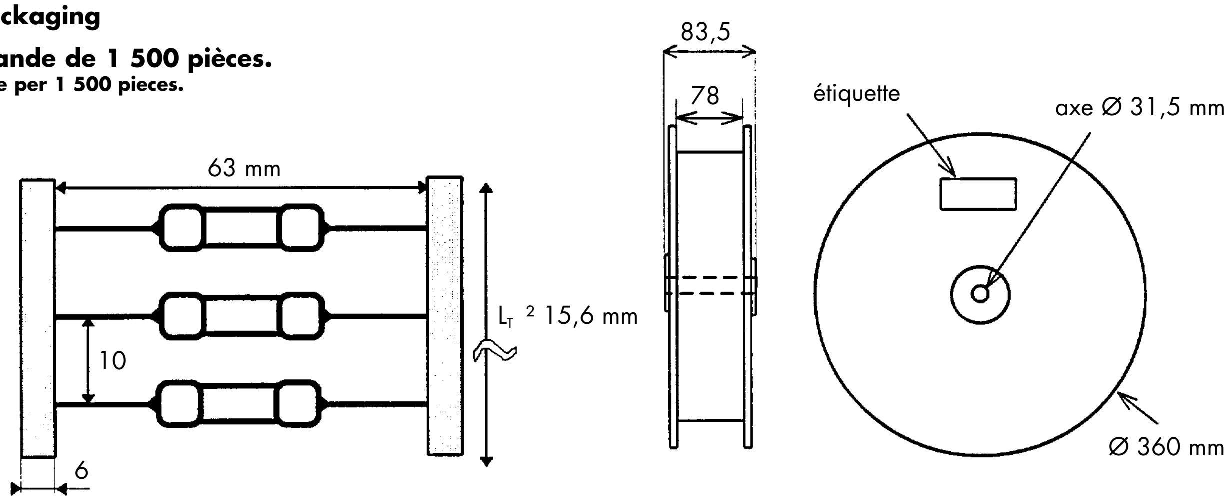


380 V FA 6,3 x 32



Conditionnement
Packaging

En bande de 1 500 pièces.
In tape per 1 500 pieces.



Remarques concernant le montage
Installation instruction

- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

Miniature Fuses

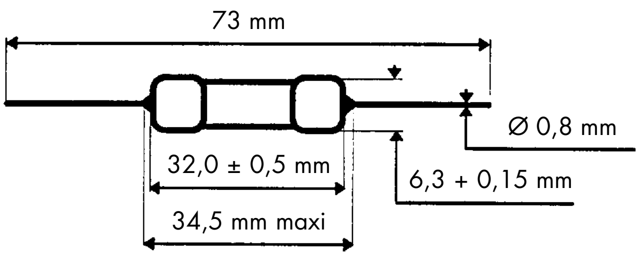
Semiconductor Fuses

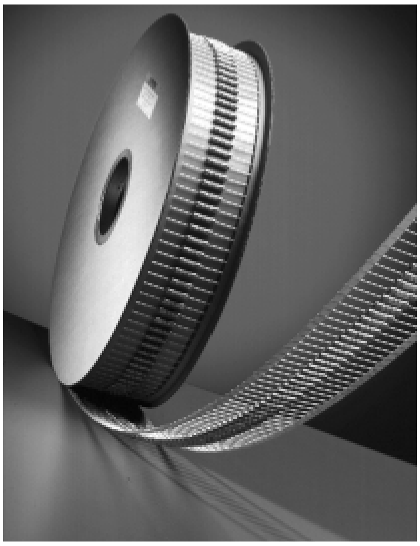
Axial leads 6x32 500V FA "AL" Very fast acting

Homologations reconnues UL E 76491
ApprovalsUL recognized E 76491

500 V ~ FA "AL"
TRÈS RAPIDE (VERY FAST ACTING)
DE (BETWEEN) 0,1A A (TO) 6,3 A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions





Poids maximum : 2,8 g
Max weight : 2,8 g

CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 500V AC	$[I^2t]$ mini de fusion Pre-arcing	$[I^2t]$ total à Total clearing at 500 V	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en bande de References in tape per
mm	V	A		A^2 s		V		1 500 pièces
		0,100		0,00057	0,002	2,75	500V FA 0,100 A 6.32 AL	A208196V
		0,125		0,00077	0,003	2,6	500V FA 0,125 A 6.32 AL	B208197V
		0,160		0,002	0,008	2,0	500V FA 0,160 A 6.32 AL	C208198V
		0,200		0,0046	0,017	1,7	500V FA 0,200 A 6.32 AL	D208199V
		0,250		0,009	0,035	1,55	500V FA 0,250 A 6.32 AL	E208200V
		0,315	200 kA	0,016	0,060	1,45	500V FA 0,315 A 6.32 AL	F208201V
		0,400	cos φ	0,03	0,11	1,40	500V FA 0,400 A 6.32 AL	G208202V
6,3		0,500	0,2	0,05	0,20	1,40	500V FA 0,500 A 6.32 AL	H208203V
x	500	0,630		0,12	0,45	1,15	500V FA 0,630 A 6.32 AL	J208204V
32		0,800		0,25	0,92	1,0	500V FA 0,800 A 6.32 AL	K208205V
		1,000		0,11	0,30	0,71	500V FA 1,000 A 6.32 AL	N207104V
		1,250		0,26	0,75	0,55	500V FA 1,250 A 6.32 AL	M208207V
		1,600		0,39	1,1	0,65	500V FA 1,600 A 6.32 AL	N208208V
		2,000		0,81	2,2	0,55	500V FA 2,000 A 6.32 AL	P208209V
		2,500		1,44	4	0,52	500V FA 2,500 A 6.32 AL	Q208210V
		3,150		2,46	7	0,53	500V FA 3,150 A 6.32 AL	R208211V
		4,000		4,6	14	0,48	500V FA 4,000 A 6.32 AL	S208212V
		5,000	20 kA	11	30	0,37	500V FA 5,000 A 6.32 AL	T208213V
		6,300	cos φ 0,2	1,1	20	0,22	500V FA 6,300 A 6.32 AL	C208037V

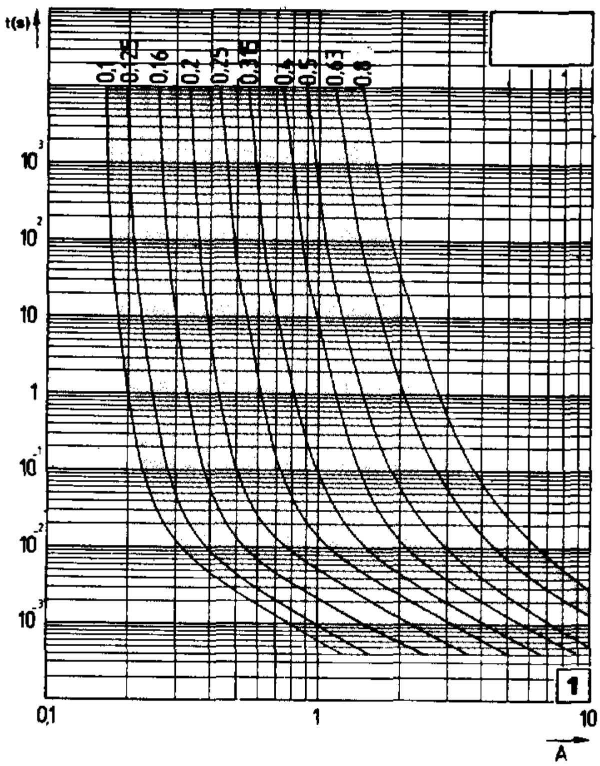
Miniature Fuses

Semiconductor Fuses

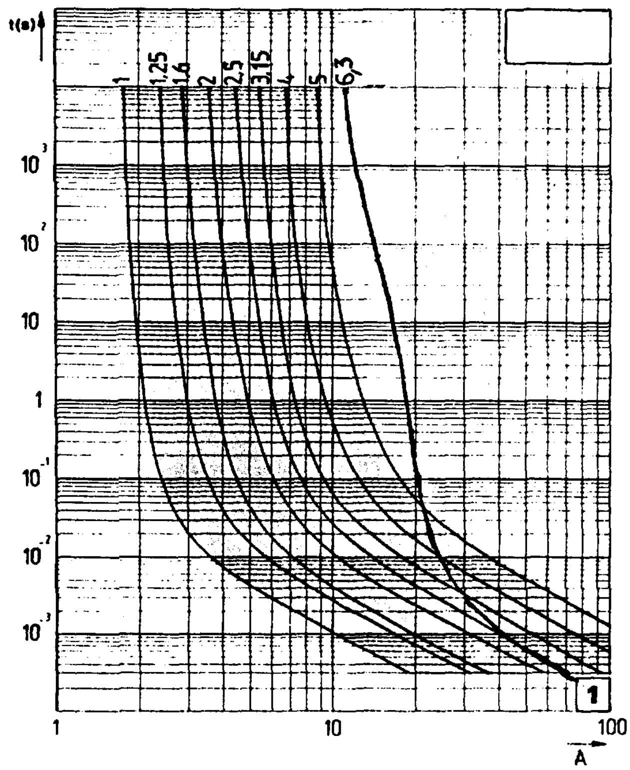
Axial leads 6x32 500V FA "AL" Very fast acting

Caractéristiques temps courant
Time current characteristics

500 V FA 6 x 32

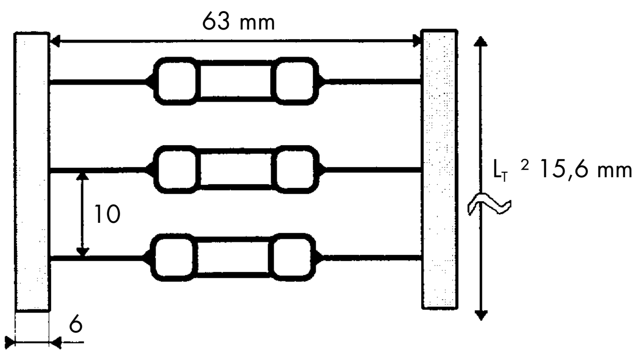


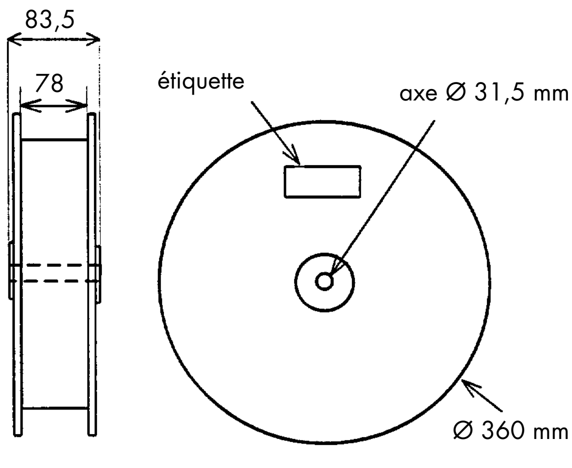
500 V FA 6,3 x 32



Conditionnement
Packaging

En bande de 1 500 pièces.
In tape per 1 500 pieces.





Remarques concernant le montage
Installation instruction

- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

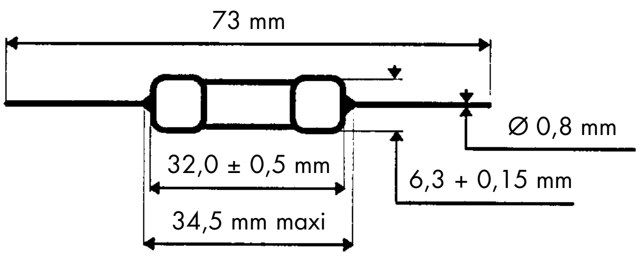
Ferraz Shawmut

Axial leads 6x32 660V FA "AL" Very fast acting

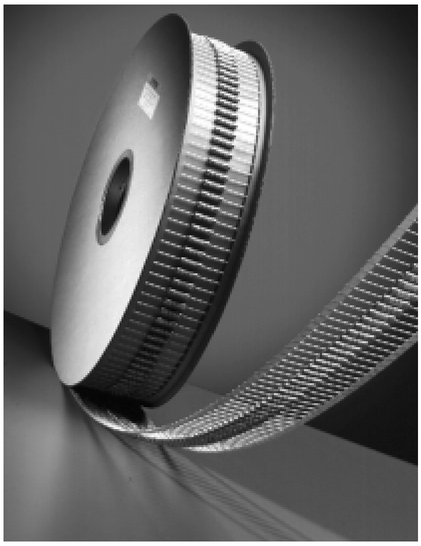
Homologations reconnues UL E 76491
Approvals UL recognized E 76491

660 V ~ FA "AL"
TRÈS RAPIDE (VERY FAST ACTING)
DE (BETWEEN) 0,1A A (AND) 2 A
TAILLE (SIZE) : 6,3 x 32

Dimensions
Dimensions



Poids maximum : 2,8 g
Max weight : 2,8 g



CARACTERISTIQUES PRINCIPALES
BASICS CHARACTERISTICS

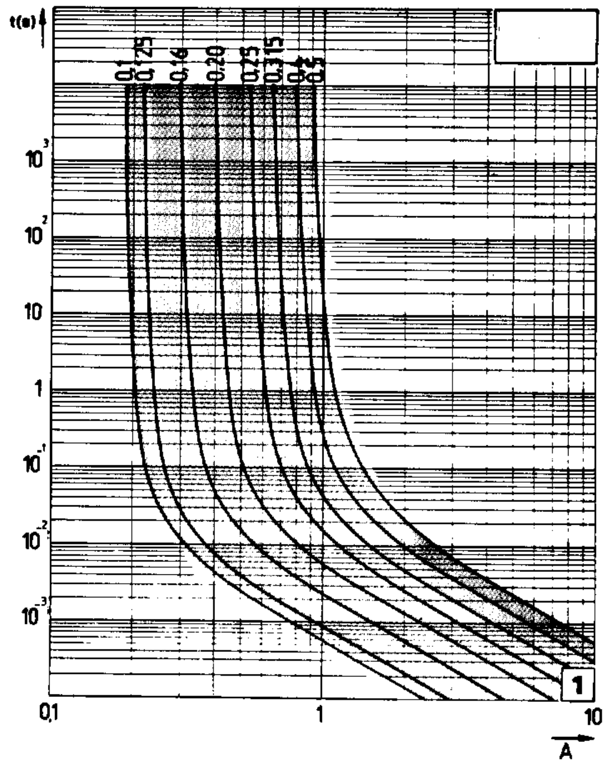
Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking Capacity under 660V AC	[I²t] mini de fusion Pre-arcing	[I²t] total à Total clearing at 660 V	Chute maxi de tension à Max voltage drop at In	Désignation Designation	Référence en bande de References in tape per
mm	V	A		A² s		V		1 500 pièces
6,3 x 32	660	0,100	30 kA cos φ 0,2	0,00057	0,0037	2,75	660V FA 0,100 A 6.32 AL	V208214V
		0,125		0,00077	0,005	2,6	660V FA 0,125 A 6.32 AL	W208215V
		0,160		0,002	0,014	2,0	660V FA 0,160 A 6.32 AL	X208216V
		0,200		0,0046	0,030	1,7	660V FA 0,200 A 6.32 AL	Y208217V
		0,250		0,009	0,060	1,55	660V FA 0,250 A 6.32 AL	Z208218V
		0,315		0,016	0,10	1,45	660V FA 0,315 A 6.32 AL	A208219V
		0,400		0,03	0,20	1,40	660V FA 0,400 A 6.32 AL	B208220V
		0,500		0,05	0,33	1,40	660V FA 0,500 A 6.32 AL	C208221V
		0,630		0,12	0,8	1,15	660V FA 0,630 A 6.32 AL	D208222V
		0,800		0,18	1,2	1,15	660V FA 0,800 A 6.32 AL	E208223V
		1,000		0,11	0,48	0,75	660V FA 1,000 A 6.32 AL	F208224V
		1,250		0,17	0,76	0,70	660V FA 1,250 A 6.32 AL	G208225V
		1,600		0,39	1,7	0,65	660V FA 1,600 A 6.32 AL	Y206285V
		2,000		0,81	3,5	0,55	660V FA 2,000 A 6.32 AL	D208038V

Semiconductor Fuses

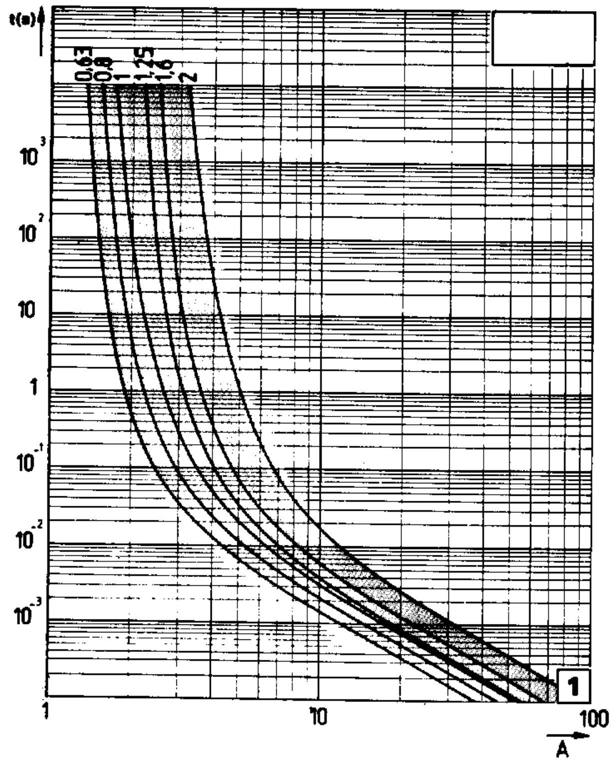
Axial leads 6x32 660V FA 'AL'' Very fast acting

Caractéristiques temps courant
Time current characteristics

660 V FA 6,3 x 32

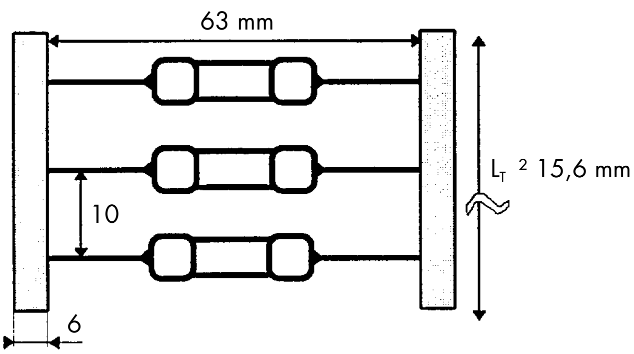


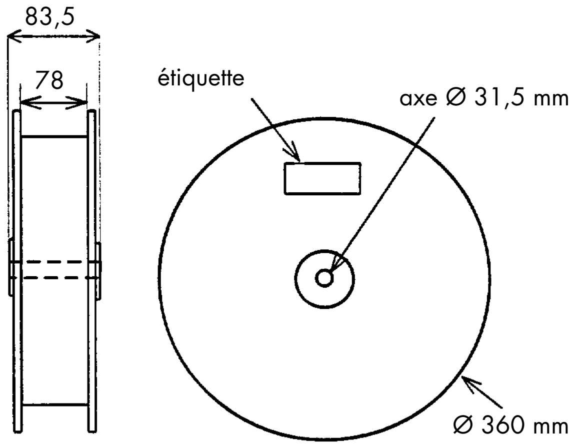
660 V FA 6,3 x 32



Conditionnement
Packaging

En bande de 1 500 pièces.
In tape per 1 500 pieces.





Remarques concernant le montage
Installation instruction

- Résistance à la chaleur lors de la soudure : selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance : according IEC 68-2-20 / 260°C for 10 seconds.
- Matière (Material) :
  - Boîtier (Body) : Corps céramique (ceramic tube)
  - Connexion (Connection) : Cuivre étamé (Tin plated copper)

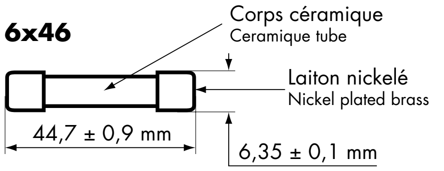
Ferraz Shawmut

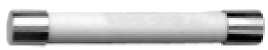
Axial leads 6x46 FA Very fast acting

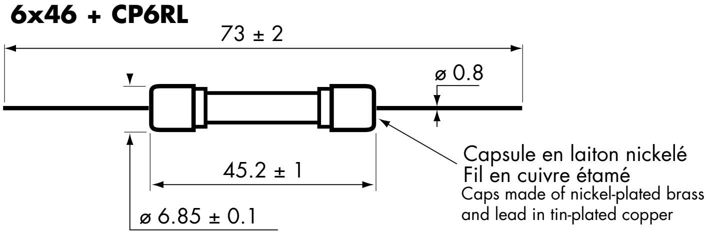
Homologations reconnues UL E 76491
Approvals UL recognized E 76491
Spécialité FERRAZ
FERRAZ speciality

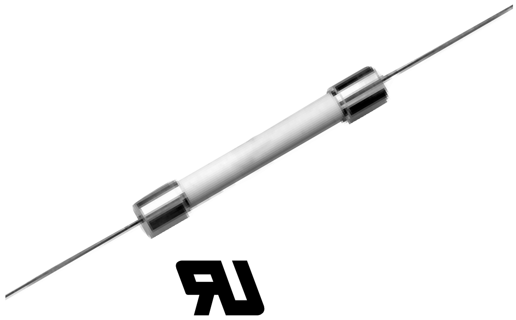
1 000 V ~ FA
TRES RAPIDE (VERY FAST ACTING)
DE (FROM) 0,1A A (TO) 1A
TAILLE (SIZE) : 6,3 x 46

Dimensions
Dimensions









Fusibles ensablés/Fuses with filler
Poids maximum : 2,5 g/Max weight : 2,5 g

CARACTERISTIQUES PRINCIPALES
MAIN CHARACTERISTICS

Taille Size	Tension nominale Rated Voltage	Intensité nominale Rated Current	Pouvoir de Coupure sous Breaking capacity @ Un	I^2t mini de fusion Pre-arcing	I^2t total à Total clearing @ Un	Chute maxi de tension à Max voltage drop @ In	Désignation Designation	6x46 Référence en boîte de References in box of	6x46+CP6RL Référence en bande de References in tape of
mm	V	A		A^2 s		V		10 pièces	1500 pièces
6,3 x 46	1 000	0.100	30 kA 1 000 V cos φ 0,2	0.0002	0.001	6.5	1 000 V FA 0,100A 6 x 46	G076458J	W209733V
		0.125		0.0006	0.003	4.4	1 000 V FA 0,125A 6 x 46	H076459J	X209734V
		0.160		0.0014	0.006	3.6	1 000 V FA 0,160A 6 x 46	J076460J	Y209735V
		0.200		0.0022	0.01	3.5	1 000 V FA 0,200A 6 x 46	K076461J	Z209736V
		0.250		0.004	0.02	3.2	1 000 V FA 0,250A 6 x 46	L076462J	A209737V
		0.315		0.008	0.04	2.9	1 000 V FA 0,315A 6 x 46	M076463J	B209738V
		0.400		0.017	0.08	2.5	1 000 V FA 0,400A 6 x 46	N076464J	C209739V
		0.500		0.036	0.16	2.2	1 000 V FA 0,500A 6 x 46	P076465J	D209740V
		0.630		0.59	0.35	1.3	1 000 V FA 0,630A 6 x 46	Q076466J	E209741V
		0.800		0.110	0.6	1.2	1 000 V FA 0,800A 6 x 46	R076467J	F209742V
		1.000		0.230	1.25	1	1 000 V FA 1,000A 6 x 46	P075660J	V209617V

Calibres inférieurs à 0,1A : nous consulter. Ratings lower than 0,1A : please enquire.

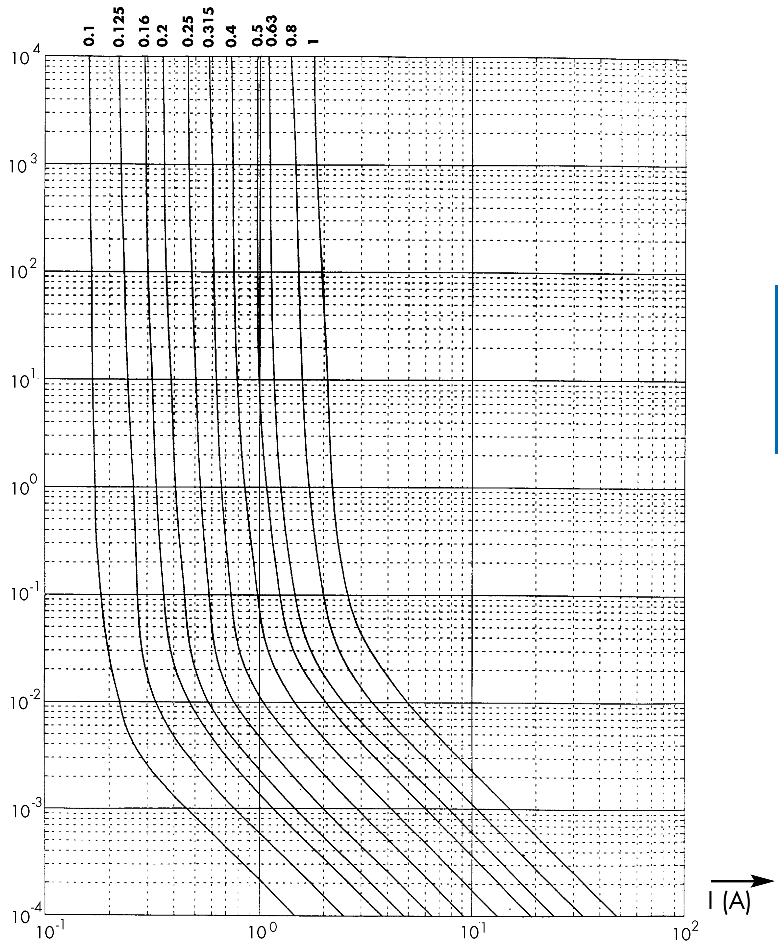
Semiconductor Fuses

Axial leads 6x46

FA Very fast acting

Caractéristiques temps courant
Time vs current characteristics

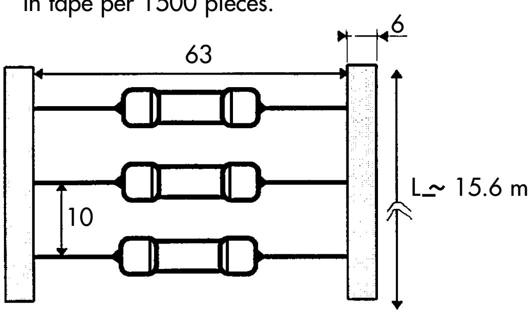
Tolérance sur la valeur moyenne du courant de préarc ± 12%.
Ces courbes indiquent pour chaque calibre, la durée de préarc en fonction de la valeur efficace du courant de préarc.
Tolerance for the mean pre-arcing current ± 12%.
These curves indicate, for each rated current, the pre-arcing time vs. the R.M.S. pre-arcing current

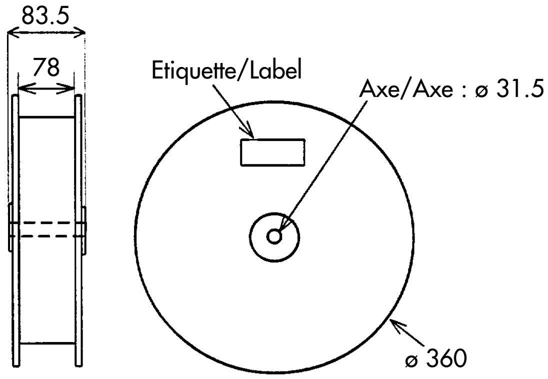


Conditionnement - Montage
Packaging - Mounting

6x46
En boite plastique de 10 pièces (55x42x19). Pour un conditionnement en boîte de 500 pièces nous consulter.
Plactic box 10 pieces (55x42x19). For a 500 pieces box packaging consult us.

6x46 + CP6RL
En bande de 1500 pièces.
In tape per 1500 pièces.

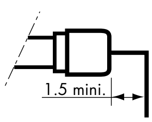




Instructions d'installation sur CI.
Installation instructions on PC board.

- Résistance à la chaleur lors de la soudure :
  selon CEI 68-2-20 / 260°C pendant 10 secondes.
  Soldering heat resistance :
  according to IEC 68-2-20 / 260°C for 10 seconds.

- Pliage des sorties filaires
  Leads bending



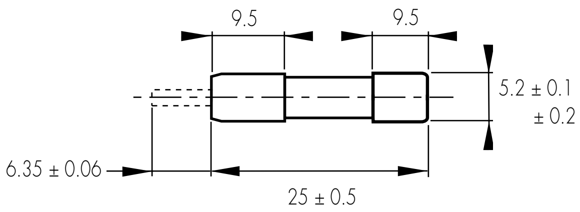
Miniature Fuses

Ferraz Shawmut specialty

Fuses with striker

250V F
250V M





250V F 5x25 with trip-indicator Fast-acting Very High interrupting rating

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
UR	250	1	D077812L	2,5	20
	250	1,6	T078999L	2,5	20
UR	250	2	V079000L	2,5	20
	250	2,5	W079001L	2,5	20

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
UR	250	4	X079002L	2,5	20
	250	5	B076844L	2,5	20
	250	6,3	Y079003L	2,5	20
	250	10	E077813L	2,5	20

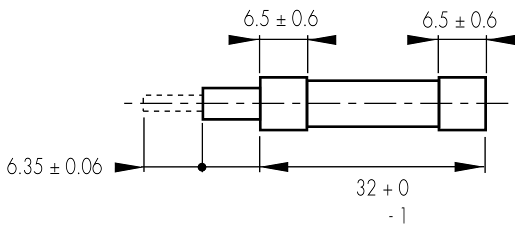
250V M 5x25 with trip-indicator Medium Time lag Very High interrupting rating

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
UR	250	1	L079015L	2,5	20
	250	1,25	M079016L	2,5	20
UR	250	1,6	N079017L	2,5	20
	250	2	P079018L	2,5	20
UR	250	2,5	Q079019L	2,5	20

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
UR	250	3,15	R079020L	2,5	20
	250	4	S079021L	2,5	20
	250	6,3	T079022L	2,5	20
	250	10	Q075684L	2,5	20

380V FA/FB
380V SA





125-380V FA/FB 6x32 with trip-indicator Very Fast-acting Very High interrupting rating

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
	380	0,8	J078921J	3,5	10
	380	1	J080393J	3,5	10
	380	1,25	A094415J	3,5	10
	380	1,6	K078922J	3,5	10
	380	2	K080394J	3,5	10
	380	2,5	W093169J	3,5	10
	380	3,15	D080641J	3,5	10
	380	4	D080917J	3,5	10
	380	5	H079771J	3,5	10

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
	380	6,3	C080916J	3,5	10
	380	8	B080915J	3,5	10
	380	10	X093170J	3,5	10
	380	12,5	Y093171J	3,5	10
	380	16	M080626J	3,5	10
	250	20	L098105J	3,5	10
	125	25	X098000J	3,5	10
	125	30	K081038J	3,5	10

380V SA 6x32 with trip-indicator Medium-Time lag Very High interrupting rating

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
	380	0,8	G099251J	3,5	10
	380	1	A079764J	3,5	10
	380	1,25	H094261J	3,5	10
	380	1,6	K094263J	3,5	10
	380	2	J089455J	3,5	10
	380	2,5	L094264J	3,5	10
	380	3,15	K089456J	3,5	10
	380	4	M094265J	3,5	10
	380	5	P094267J	3,5	10

Approvals	Voltage rating UN (V)	Rating (A)	Part #	Weight (g)	Pack.
	380	6,3	Z093172J	3,5	10
	380	8	Q094268J	3,5	10
	380	10	Y081027J	3,5	10
	250	12,5	T094271J	3,5	10
	250	16	W094273J	3,5	10
	250	20	X099472J	3,5	10
	125	25	X094274J	3,5	10
	125	30	J094285J	3,5	10

Semiconductor Fuses

Fuses maintenance set



Range 5SF - 5x20 - 250V~ - Quick acting F - Low breaking capacity L

REFERENCE NUMBER: G203763

According to IEC-127-2 publication standard sheet 2

Breaking capacity under 250 V ~ : 35 A or 10 I_N					
100 mA A090505	**125 mA** B090506	**160 mA** C090507	**200 mA** D090508	**250 mA** E090509	**315 mA** F090510
400 mA G090511	**500 mA** H090512	**630 mA** J090513	**800 mA** K090514	**1 A** L090515	**1,25 A** M090516
1,6 A N090517	**2 A** P090518	**2,5 A** Q090519	**3,15 A** R090520	**4 A** S090521	**6,3 A** V090523

Max weight : 400 g

Packaging : 360 pieces (20x18)

Range 5ST - 5x20 - 250V~ - Time lag T - Low breaking capacity L

REFERENCE NUMBER: H203763

According to IEC-127-2 publication standard sheet 3

Breaking capacity under 250 V ~ : 35 A or 10 I_N					
100 mA F090533	**125 mA** G090534	**160 mA** H090535	**200 mA** J090536	**250 mA** K090537	**315 mA** L090538
400 mA M090539	**500 mA** N090540	**630 mA** P090541	**800 mA** Q090542	**1 A** R090543	**1,25 A** S090544
1,6 A T090545	**2 A** V090546	**2,5 A** W090547	**3,15 A** X090548	**4 A** Y090549	**6,3 A** A090551

Max weight : 400 g

Packaging : 360 pieces (20x18)

Semiconductor Fuses

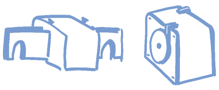
American Round Fuses

Form 101

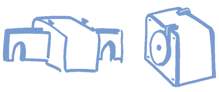


American and European Square-body Fuses

450V to 700V AC



650V to 1300V AC



European Fuses

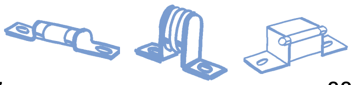
French Ferrule



DIN Fuses



BS88 Fuses

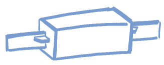


DC Fuses

Ferrule Fuses



Square-body Fuses



Microswitches and Studs

American Round Fuses

Form 101 A13X



A13X Amp-trap® Form 101 semiconductor protection fuses were designed for the specific protection of diodes and other semiconductor devices rated 130VAC or less. A13X fuses are very small for their ampere ratings, especially the hockey-puck type in the higher ampere ratings.

Features/Benefits

- ✔ **Low I^2t** minimizes damage to protected components on short circuit
- ✔ **Controlled arc voltage** reduces stress to circuit components during fuse clearing
- ✔ **Choice of mounting types** helps in equipment design

Ratings

- ✔ **AC:** 1-6000A
130VAC, 8kA I.R.
- ✔ **DC:** 70-2000A
100VDC,10kA I.R.
2500-3000A
100VDC, 20kA I.R.
L/R=10ms

Approvals

- ✔ UL Recognized Component
- ✔ AC: Guide No. JFHR2 (1-25A, 70-2000A)
- ✔ DC Tested to UL Standard 198L parameters (70-3000A)

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Current Limiting
- ✔ Low I^2t
- ✔ Indicator Options Available

APPLICATIONS:

- ✔ Protection of heavy duty devices such as electrochemical rectifiers

Catalog Numbering System

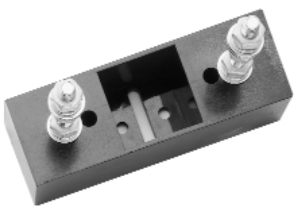
A 13 X 400 - 4 TA

Amp-trap® Fuse	A
Rated Volts - 130	13
Style (Fast acting, low I^2t)	X
Amperes*	400
Mounting Types*	
Ferrule	1
Ferrule, midget dims. (1-1/2” x 13/32”)	2
Blades, bolt-in	4
Hockey puck, bolt-in	128
Integral Blown-Fuse Indicator Trigger Actuator	TA

* For ampere ratings and types not listed, ask sales agent.

Single Pole Fuse Blocks for A13X Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
1-30	30311	A212405
31-60	60306J	J211884
61-100	P243D	C219560
101-200	P243D	C219560
201-450	P243D	C219560
500-600	P243G	H222762



Form 101 A13X

Standard Fuse Ampere Ratings, Catalog and Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REF. NUMBER	OUTLINE FIG.
1	A13X1-2	N222652	1	60	A13X60-1	R217894	1		-	-	-
2	A13X2-2	P202252	1	70	A13X70-4	K215841	2	450	A13X450-4	V219967	2
3	A13X3-2	T212790	1	-	-	-	-	500	A13X500-4	Z202238	2
4	A13X4-2	G214320	1	80	A13X80-4	H217380	2	500	A13X500-4TA	H211239	3
5	A13X5-2	L215842	1	-	-	-	-	600	A13X600-4	D213305	2
6	A13X6-2	J217381	1	90	A13X90-4	M218925	2	600	A13X600-4TA	W213804	3
7	A13X7-2	Z218407	1	100	A13X100-4	M217890	2	800	A13X800-4	Y218406	2
8	A13X8-2	N218926	1	-	-	-	-	1000	A13X1000-4	K222649	2
10	A13X10-2	B223170	1	130	A13X130-4	F211237	2	-	-	-	-
12	A13X12-2	H200958	1	-	-	-	-	1000	A13X1000-128	Z219442	4
15	A13X15-2	Y201501	1	150	A13X150-4	E212271	2	1200	A13X1200-128	W201499	4
20	A13X20-2	J211240	1	-	-	-	-	1500	A13X1500-128	D214317	4
25	A13X25-2	H212274	1	200	A13X200-4	H215839	2	2000	A13X2000-128	Q216858	4
30	A13X30-2	E213306	1	250	A13X250-4	W218404	2	2500	A13X2500-128	A219443	4
35	A13X35-1	X213805	1	-	-	-	-	3000	A13X3000-128	Y202237	4
40	A13X40-1	D214823	1	300	A13X300-4	L222650	2	3000	A13X3000-128TA	F212272	5
-	-	-	-	-	-	-	-	3500	A13X3500-128	E214318	6
45	A13X45-1	G215332	1	350	A13X350-4	R212788	2	4000	A13X4000-128	L218924	6
50	A13X50-1	P216351	1	-	-	-	-	4000	A13X4000-128TA	B219444	7
50	A13X50-4	G200957	2	400	A13X400-4	G217379	2	5000	A13X5000-128	G212273	8
55	A13X55-1	S216860	1	400	A13X400-4TA	P217892	3	6000	A13X6000-128	C214822	8

For ampere ratings and styles not listed, ask sales agent.

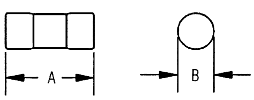


Figure 1

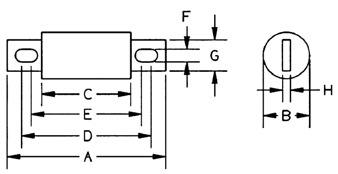


Figure 2

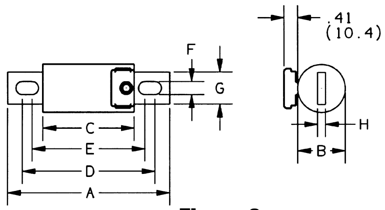


Figure 3

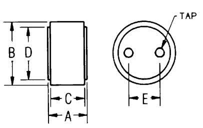


Figure 4

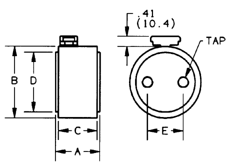


Figure 5

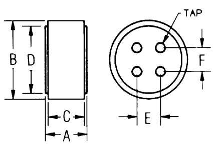


Figure 6

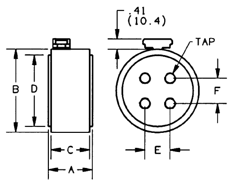


Figure 7

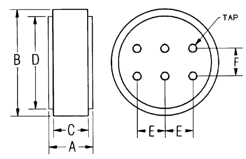


Figure 8

Dimensions

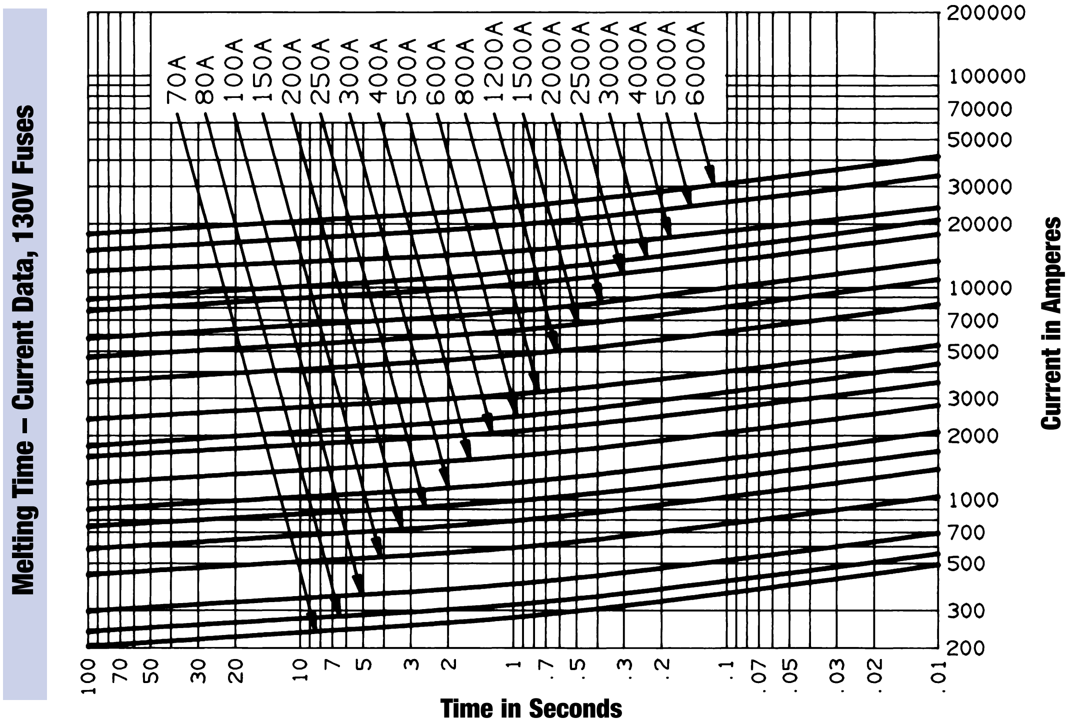
CATALOG NUMBER	MOUNTING TYPE	FIG.	DIMENSIONS - INCHES (mm)								TAP
			A	B	C	D	E	F	G	H	
A13X1 to 30	2	1	1.50 (38.1)	.41 (10.4)	- -	- -	- -	- -	- -	- -	- -
A13X35 to 60	1	1	2.00 (50.8)	.81 (20.6)	- -	- -	- -	- -	- -	- -	- -
A13X70 to 450	4, 4TA	2, 3*	2.66 (67.6)	1.13 (28.7)	1.16 (29.5)	2.19 (55.6)	1.91 (48.5)	.31 (7.9)	.88 (22.4)	.19 (4.8)	- -
A13X500 to 1000	4, 4TA	2, 3*	3.50 (88.9)	1.50 (38.1)	1.25 (31.8)	2.56 (65.0)	1.94 (49.3)	.41 (10.4)	1.00 (25.4)	.25 (6.4)	- -
A13X1000 to 2000	128	4	1.88 (47.8)	2.00 (50.8)	1.63 (41.4)	1.75 (44.5)	1.00 (25.4)	- -	- -	- -	3/8-24-1/2 Deep -
A13x2500 to 3000	128, 128TA	4, 5*	1.88 (47.88)	3.00 (76.2)	1.63 (41.4)	2.50 (63.5)	1.50 (38.1)	- -	- -	- -	1/2-20-1/2 Deep -
A13X3500 to 4000	128, 128TA	6, 7*	1.88 (47.88)	3.50 (88.9)	1.63 (41.4)	3.00 (76.2)	1.06 (27.0)	1.06 (27.0)	- -	- -	1/2-20-1/2 Deep -
A13X5000 to 6000	128	8	2.38 (60.5)	5.75 (146)	1.88 (47.7)	5.00 (127)	1.50 (38.1)	1.50 (38.1)	- -	- -	1/2-20-1/2 Deep -

* Optional Trigger Actuator (TA)

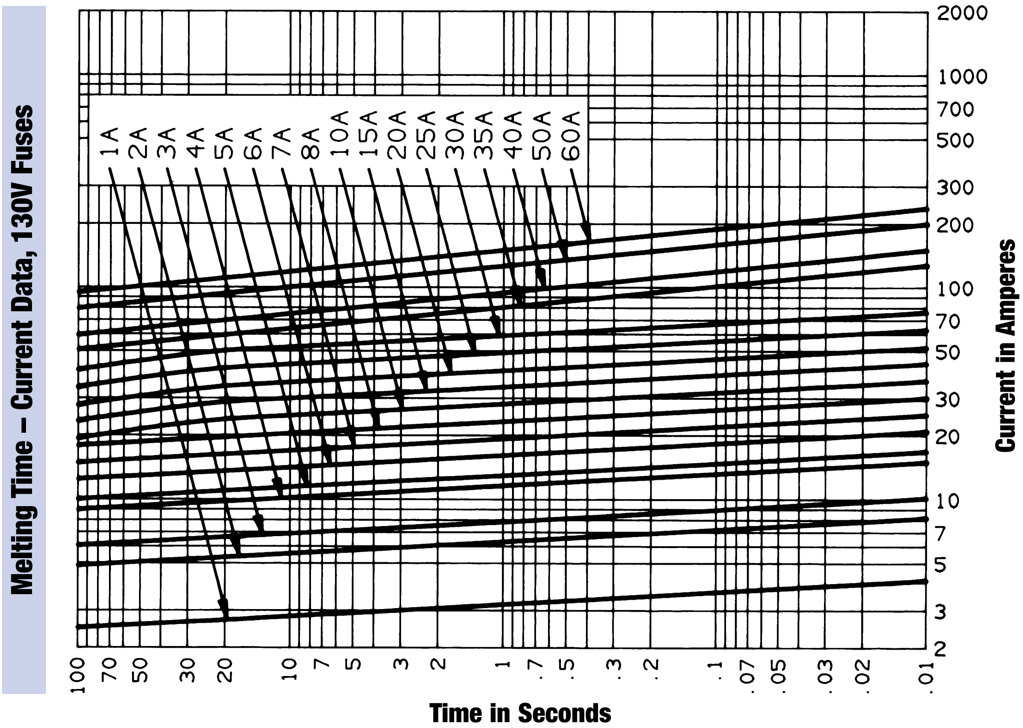
Form 101

A13X

A13X70 to 6000



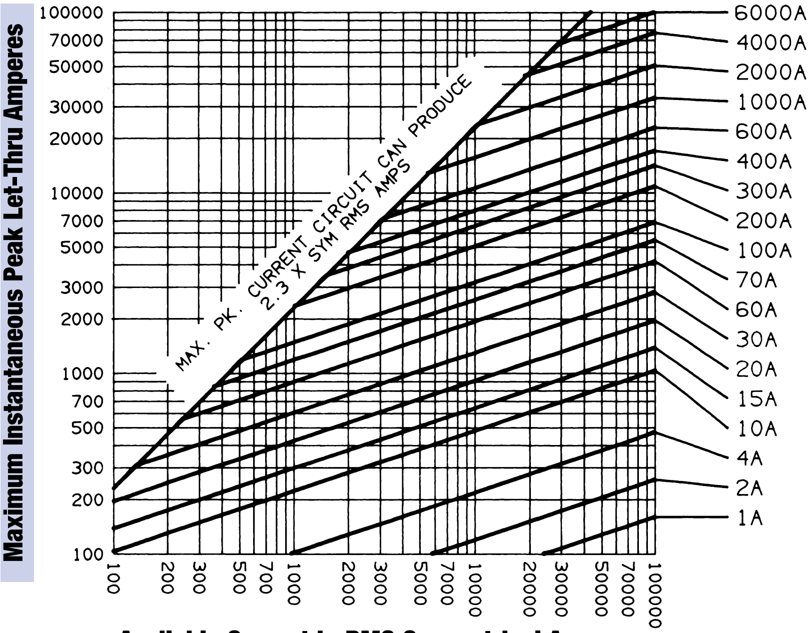
A13X1 TO 60



Form 101

A13X

Peak Let-Thru Current Data – A13X1 to 6000, 130 Volts AC



Available Current in RMS Symmetrical Amperes

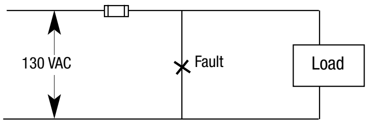


Fig. A

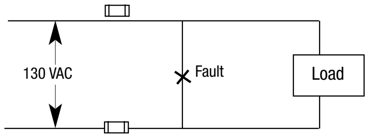
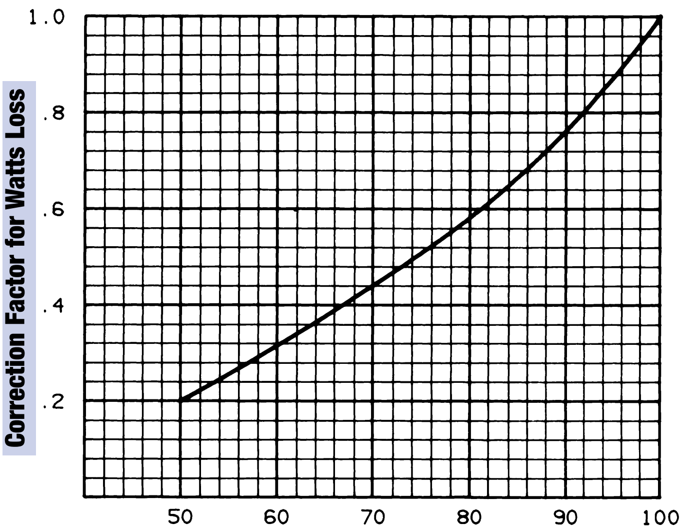


Fig. B

Watts Loss at Rated Current

AMPERE RATING	WATTS LOSS (W)	AMPERE RATING	WATTS LOSS (W)	AMPERE RATING	WATTS LOSS (W)
70	2.7	350	18	2000	92
80	3.2	400	20	2500	116
90	3.9	450	23	3000	149
100	4.1	500	20	3500	178
130	5.8	600	26	4000	190
150	6.6	800	37	4500	240
200	9.1	1000	44	5000	280
250	12	1200	52	6000	356
300	15	1500	65		

Watts Loss Correction vs. Percent Rated Current



Percent Rated Current

I^2t Data – 130 Volts AC

FUSE AMPERE RATING	I^2t DATA (AMPERE² SECONDS)		
	MELTING A^2s	CLEARING AT 130V: 1 FUSE (FIG. A) A^2s	CLEARING AT 130V: 2 FUSES IN SERIES (FIG. B) A^2s
1	.02	.1	.05
2	.10	.35	.25
3	.18	.7	.5
4	.50	2	1.5
5	.75	3	2
6	1.1	4	3
7	1.6	6	4
8	2.9	10	7
10	5.0	18	12
12	6.3	22	15
15	10	35	25
20	34	120	80
25	65	230	150
30	100	350	230
35	85	450	300
40	120	640	420
45	150	800	520
50	240	1,300	840
55	280	1,500	1,000
60	340	1,800	1,200
70	840	4,200	2,100
80	1,000	5,000	2,500
90	1,300	6,500	3,300
100	1,600	8,000	4,000
130	2,500	12,000	6,300
150	3,600	18,000	9,000
200	6,400	32,000	16,000
250	10,000	50,000	25,000
300	14,000	70,000	35,000
350	20,000	100,000	50,000
400	26,000	130,000	65,000
450	32,000	160,000	80,000
500	40,000	200,000	100,000
600	58,000	290,000	140,000
800	100,000	500,000	250,000
1,000	160,000	800,000	400,000
1,200	240,000	1,200,000	600,000
1,500	360,000	1,800,000	900,000
2,000	640,000	3,200,000	1,600,000
2,500	1,000,000	5,000,000	2,500,000
3,000	1,400,000	7,000,000	3,500,000
3,500	1,800,000	9,000,000	4,500,000
4,000	2,400,000	12,000,000	6,000,000
5,000	3,700,000	18,000,000	9,000,000
6,000	5,400,000	27,000,000	14,000,000

Semiconductor Fuses

American Round Fuses

Form 101 — A25X



A25X Amp-trap® Form 101 semiconductor protection fuses were designed for heavy duty rectifiers such as those used in the electro-chemical industry. Originally designed for diode protection, A25X fuses have been particularly reliable in heavy duty applications of many types.

Features/Benefits

- ✔ **Low I²t** minimizes damage to protected component on short circuit
- ✔ **Controlled arc voltage** reduces stress to circuit components during fuse clearing
- ✔ **Choice of mounting types** helps in equipment design

Ratings

- ✔ **AC:** 10-30A
  300VAC, 50kA I.R.
  35-60A
  250 VAC, 100kA I.R.
  70-800A
  250VAC, 10,600A I.R.
  1000-4500A
  250VAC

Approvals

- ✔ UL Recognized Component
- ✔ AC: UL Guide No. JFHR2 (10-250A)

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Current Limiting
- ✔ Low I²t
- ✔ Indicator Options Available

APPLICATIONS:

- ✔ Protection of 250 volt heavy duty rectifiers and similar heavy power supplies

CAT. Numbering System

A 25 X 600 - 4 TA

Field	Code
Amp-trap® Fuse	A
Rated Volts - 250	25
Style (Fast acting, low I²t)	X
Amperes*	600
Mounting Types*	
Ferrule	1
Blades, bolt-in	4
Hockey puck, bolt-in	128
Integral Blown-Fuse Indicator	
Trigger Actuator	TA

* For ampere ratings and types not listed, ask sales agent.

Single Pole Fuse Blocks for A25X Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
1-30	20306	Z212381
31-60	P243G	H222762
61-100	P243	T218517
101-200	P243	T218517
201-400	P243G	H222762
401-700	P243G	H222762



Semiconductor Fuses

American Round Fuses

Form 101 A25X

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.
1	A25X1-1	D201506	1	90	A25X90-4	M200962	3	550	A25X550-4	P215845	3
2	A25X2-1	K213311	1	100	A25X100-4	H215333	3	600	A25X600-4	S216354	3
3	A25X3-1	J214828	1	-	-	-	-	600	A25X600-4TA	M217384	4
4	A25X4-1	Y216865	1	125	A25X125-4	P218927	3	-	-	-	-
5	A25X5-1	E218412	1	130	A25X130-4	E219447	3	700	A25X700-4	R218929	3
6	A25X6-1	C219974	1	150	A25X150-4	Y219970	3	700	A25X700-128	-	5
7	A25X7-1	P200964	1	-	-	Y219970	-	800	A25X800-4	S222656	3
8	A25X8-1	E201507	1	175	A25X175-4	L211242	3	800	A25X800-4TA	E223173	4
9	A25X9-1	C202264	1	200	A25X200-4	Y211759	3	800	A25X800-128	A219972	5
10	A25X10-1	B202263	1	-	-	-	-	1000	A25X1000-128	K217382	5
12	A25X12-1	M212278	1	225	A25X225-4	J214322	3	-	-	-	-
15	A25X15-1	Z212795	1	250	A25X250-4	F214825	3	1200	A25X1200-128	S217895	5
20	A25X20-1	C213810	1	-	-	F214825	-	1500	A25X1500-128	K200960	6
25	A25X25-1	M214325	1	300	A25X300-4	V216862	3	1600	A25X1600-128	Y202260	6
30	A25X30-1	M215337	1	-	-	-	-	2000	A25X2000-128	G213308	6
35	A25X35-4	V216356	2	300	A25X350-4	F219448	3	2500	A25X2500-128	N215844	6
40	A25X40-4	X217899	2	350	A25X400-4	L200961	3	3000	A25X3000-128	B218409	6
50	A25X50-4	J219451	2	400	A25X400-4TA	B201504	4	3500	A25X3500-128	Z219971	6
60	A25X60-4	G223175	2	-	-	-	-	4000	A25X4000-128	M211243	6
70	A25X70-4	C218410	3	400	A25X450-4	Z211760	3	4500	A25X4500-128	K212276	6
80	A25X80-4	G219449	3	500	A25X500-4	X212793	3				

For ampere ratings and styles not listed, ask sales agent.

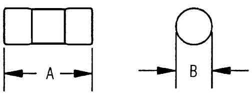


Figure 1

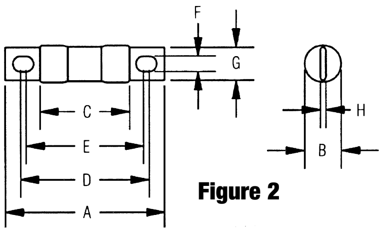


Figure 2

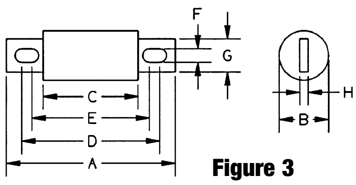


Figure 3

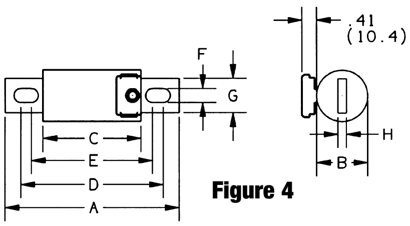
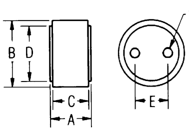
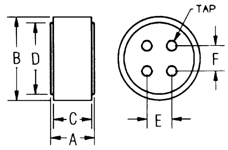


Figure 4





Dimensions

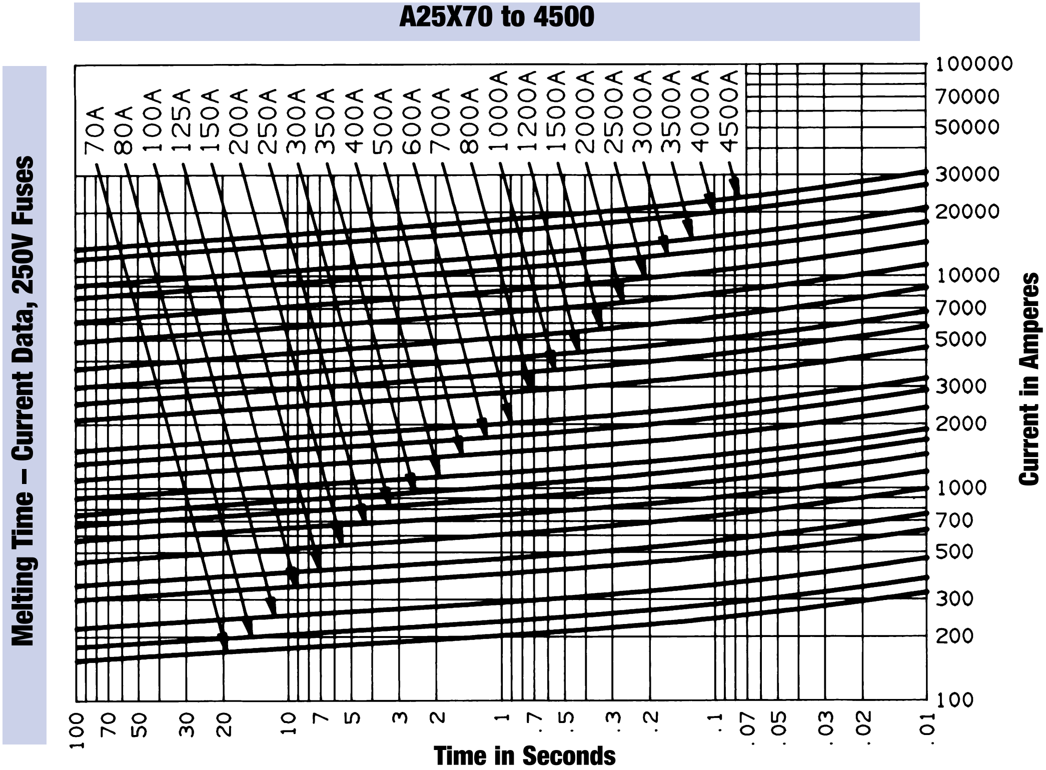
OUTLINE REF.	MOUNTING TYPE	FIG.	DIMENSIONS - INCHES (mm) A	B	C	D	E	F	G	H	TAP
A25X1 to 30	1	1	2.00 (50.8)	0.56 (14..2)	- -	- -	- -	- -	- -	- -	- -
A25X35 to 60	4	2	3.19 (81..0)	0.81 (20.6)	1.63 (41..4)	2.50 (63.5)	2.25 (57.5)	0.34 (8.6)	0.72 (18.3)	0.13 (3.3)	- -
A25X70 to 200	4	3	3.13 (79.5)	1.22 (31.0)	1.63 (41.4)	2.44 (62.0)	2.31 (58.7)	0.31 (7.9)	1.00 (2.54)	0.19 (4.8)	- -
A25X225 to 700	4, 4TA	3, 4*	3.84 (97.5)	1.50 (38.1)	1.59 (40.1)	2.91 (73.9)	2.28 (57.9)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)	- -
A25X800	4, 4TA	3, 4*	3.84 (97.5)	2.00 (50.8)	1.59 (40.4)	2.91 (73.9)	2.28 (57.9)	0.41 (10.4)	1.50 (38.1)	0.25 (6.4)	- -
A25X700 to 1200	128	5	2.59 (65.8)	3.00 (76.2)	2.34 (59.4)	2.50 (63.5)	1.50 (38.1)	- -	- -	- -	3/8-24-1/2 Deep -
A25X1500 to 2500	128, 128TA	6, 7*	2.59 (65.8)	3.50 (88.9)	2.34 (59.4)	3.00 (76.2)	1.50 (38.1)	1.50 (38.1)	- -	- -	3//8-24-1/2 Deep -
A25X3000 to 4500	128, 128TA	6, 7*	2.59 (65.8)	4.50 (114)	2.34 (59.4)	3.75 (95.3)	1.50 (38.1)	1.50 (38.1)	- -	- -	1/2-20-1/2 Deep -

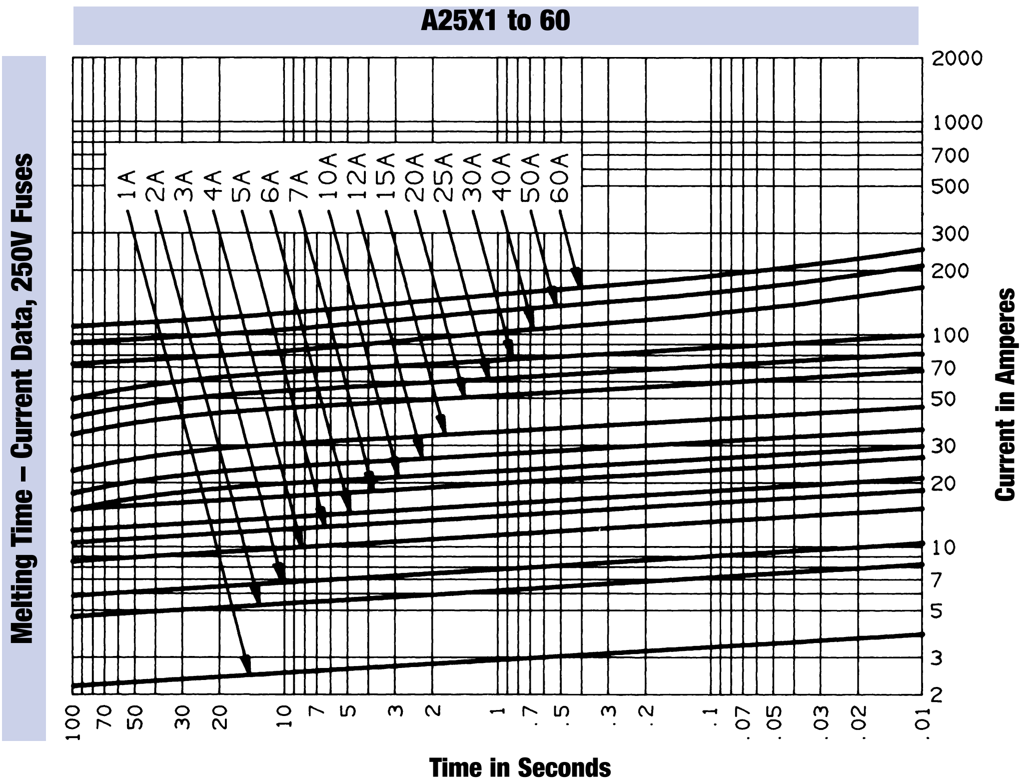
* Optional Trigger Actuator (TA)

American Round Fuses

Form 101

A25X

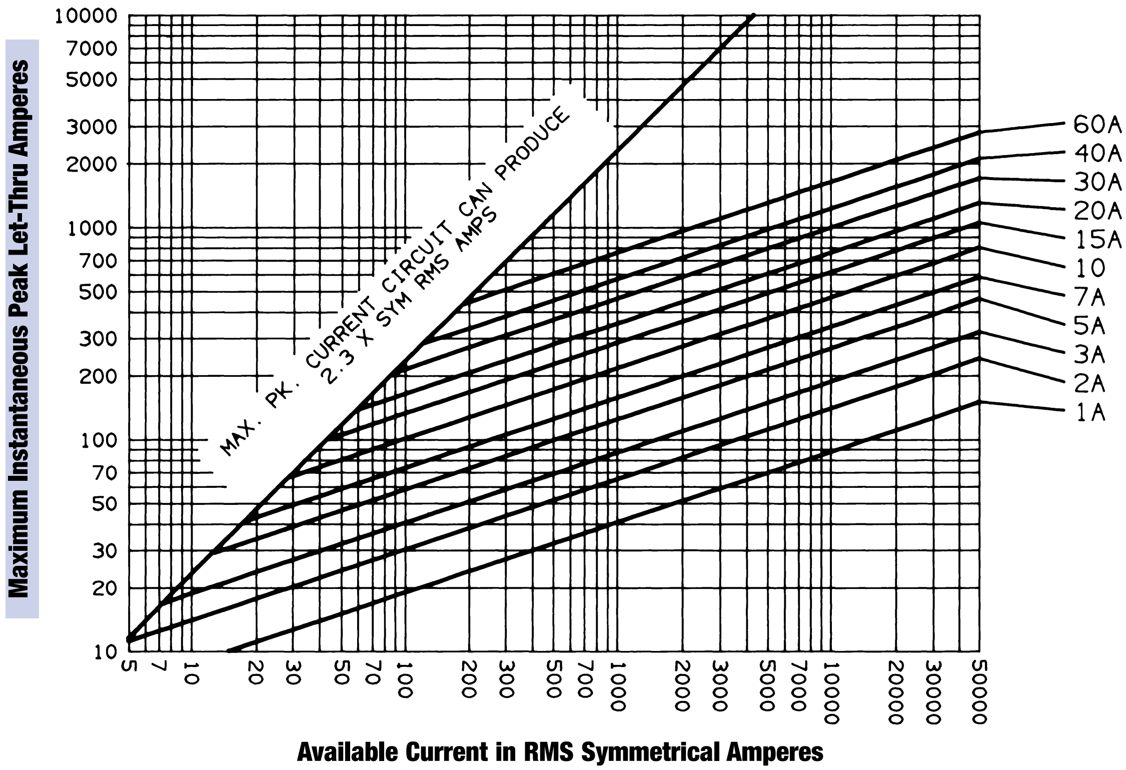




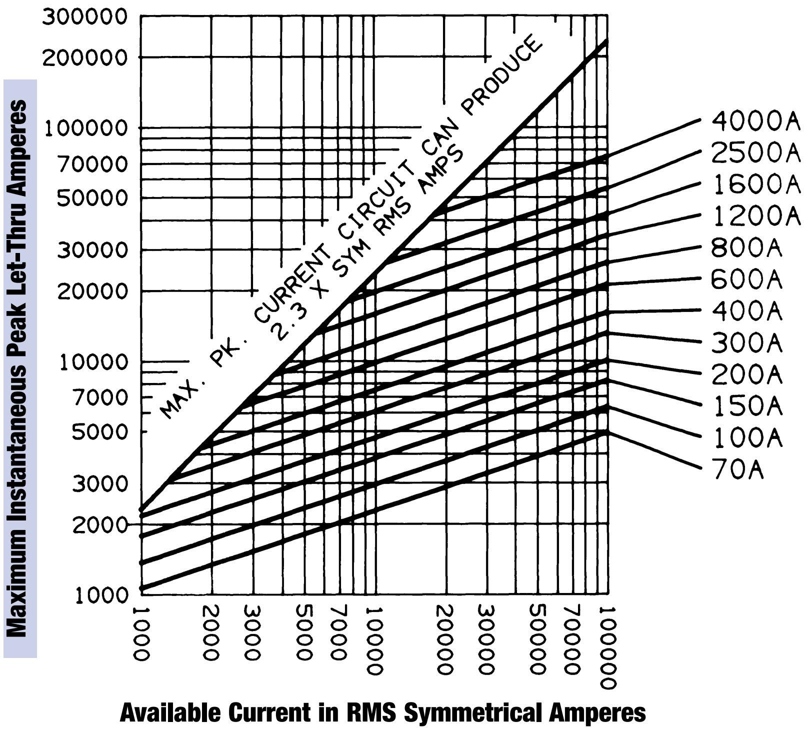
Form 101

A25X

Peak Let-Thru Current Data – A25X1 to 60, 250 Volts AC



Peak Let-Thru Current Data – A25X70 to 4000, 250 Volts AC



Form 101 A25X

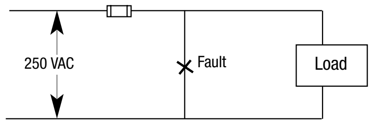


Fig. A

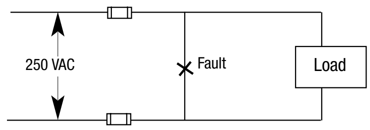
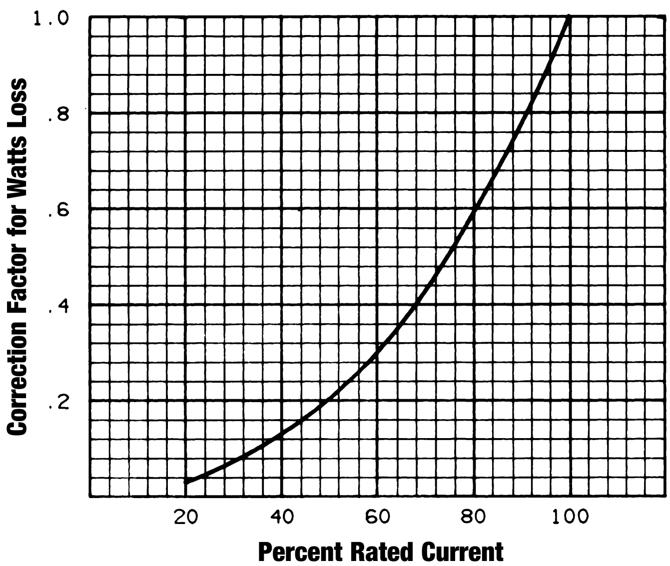


Fig. B

Watts Loss at Rated Current

AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)
70	4.4	250	19	1000	57
80	5.1	300	22	1200	70
90	5.5	350	26	1500	88
100	6.5	400	30	2000	122
125	7.6	450	32	2500	142
150	9.3	500	37	3000	164
175	11	600	45	3500	191
200	13	700	55	4000	198
225	15	800	51	4500	211
				5000	228

Watts Loss Correction vs. Percent Rated Current



I^2t Data – 250 Volts AC

FUSE AMPERE RATING	I^2t DATA MELTING A^2s	CLEARING AT 250V 1 FUSE (FIG. A) A^2s	2 FUSES IN SERIES (FIG. B) A^2s
1	.033	.27	.18
2	.17	1.5	.98
3	.32	3.8	2.5
4	.85	6.9	4.6
5	1.3	8.7	5.8
6	1.9	9.6	6.4
7	2.7	13	8.4
8	5.0	24	16
9	8.6	31	21
10	13	39	26
12	18	54	36
15	20	60	40
20	36	110	72
25	56	170	110
30	81	240	160
35	95	540	380
40	120	690	460
50	190	960	640
60	280	1,400	960
70	420	3,500	2,100
80	550	4,600	2,300
90	700	5,800	2,500
100	860	7,200	3,000
125	1,300	11,000	4,100
150	2,000	16,000	6,000
175	2,600	22,000	8,000
200	3,400	29,000	11,000
225	4,300	36,000	13,000
250	5,400	45,000	16,000
300	7,700	65,000	24,000
350	11,000	88,000	32,000
400	14,000	110,000	42,000
450	18,000	140,000	53,000
500	22,000	180,000	66,000
600	31,000	260,000	95,000
700	42,000	350,000	130,000
800	55,000	460,000	170,000
1,000	86,000	720,000	260,000
1,200	125,000	1,000,000	380,000
1,500	200,000	1,600,000	600,000
1,600	220,000	1,800,000	680,000
2,000	350,000	2,900,000	1,100,000
2,500	550,000	4,500,000	1,600,000

Semiconductor Fuses

American Round Fuses

Form 101 — A50QS-4R



A50QS-4R Amp-trap® Form 101 semiconductor fuses are the latest addition to the A50QS product family. A50QS-4R fuses are made using a revolutionary new construction, which includes an engineered resin body, resulting in our best performing fuse at a reasonable price. The A50QS-4R has the lowest watts loss of all 500V semiconductor fuses, lower I^2t for better equipment protection, and longer life on cyclic load applications. The A50QS (35-400)-4R was designed to replace A50QS (35-400)-4 to provide the very best protection of dynamic solid-state equipment such as motor drives, inverters, UPS, etc.

Features/Benefits

- ✔ **Designed for performance -** low I^2t for superior short circuit protection and melting characteristics designed for longer life on re-occurring overloads
- ✔ **Lowest watts loss** of all 500V semiconductor fuses
- ✔ **Light weight** compared to other fuses in its class
- ✔ **Rectangular body** will not roll off a table or workbench
- ✔ **Superior cycling ability** compared to other fuses in its class

HIGHLIGHTS:

- ✔ 500V AC/DC Rated
- ✔ Very Low I^2t
- ✔ Lowest Watts Loss
- ✔ Superior Cycling Ability
- ✔ Light Weight

APPLICATIONS:

- ✔ Protection of 500V or less motor drives, UPS, inverters, etc.

Ratings

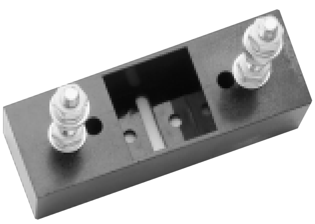
- ✔ **AC:** 35-400A 500VAC, 200kA
- ✔ **DC:** 35-400A 500VDC, 87kA

Approvals

- ✔ UL Recognized Component
- ✔ AC: Guide No. JFHR2
- ✔ DC Tested to UL Standard 198L Parameters
- ✔ CSA Class 142330 File LR12636

Single Pole Fuse Blocks for A50QS Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
35-200	P243E	X222016
225-400	P266C	K212897



Catalog Numbering System

A 50 QS 250 - 4R

Amp-trap® Fuse	A
Rated Volts - 500	50
Style	QS
Amperes*	250
Mounting Type* Blades, bolt-in	4R

* For ampere ratings and types not listed, ask sales agent.

Ferraz Shawmut

Form 101 A50QS-4R

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	FIG.
35	A50QS35-4R	E217906	1
40	A50QS40-4R	B218938	1
50	A50QS50-4R	K219981	1
60	A50QS90-4R	M201514	1
70	A50QS70-4R	P223182	1
80	A50QS80-4R	W200970	1
90	A50QS90-4R	M201514	1
100	A50QS100-4R	E212800	1
125	A50QS125-4R	P213315	1
150	A50QS150-4R	H213815	1
175	A50QS175-4R	T214331	1
200	A50QS200-4R	R214835	1
225	A50QS225-4R	V215344	2
250	A50QS250-4R	Z215854	2
300	A50QS300-4R	F216872	2
350	A50QS350-4R	M218419	2
400	A50QS400-4R	R219458	2

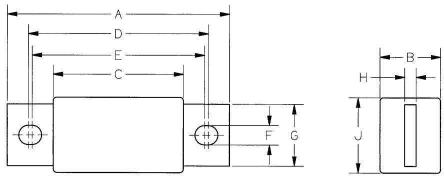


Figure 1

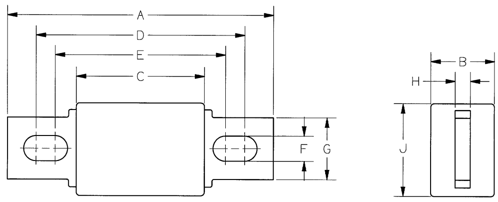


Figure 2

Dimensions

CATALOG NUMBER	MOUNTING TYPE	DIMENSIONS - INCHES (mm)									OUTLINE FIG.
		A	B	C	D	E	F	G	H	J	
A50QS35 to 100	4R	3.63 (92.1)	.80 (20.2)	2.13 (54.0)	3.03 (76.9)	2.56 (65.01)	0.34 (8.6)	0.75 (19.1)	0.13 (3.2)	1.00 (25.4)	1
A50QS125 to 200	4R	3.63 (92.1)	0.99 (25.1)	2.13 (54.0)	3.03 (76.9)	2.56 (65.0)	0.34 (8.6)	1.00 (25.4)	0.19 (4.8)	1.22 (30.9)	1
A50QS225 to 400	4R	4.35 (110.3)	1.05 (26.6)	2.09 (53.2)	3.54 (89.9	2.68 (68.1)	0.41 (10.3)	1.00 (25.4)	0.25 (6.4)	1.50 (38.1)	2

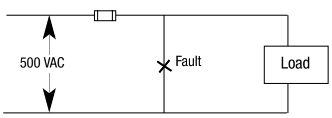


Fig. A

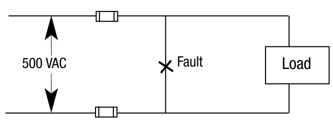
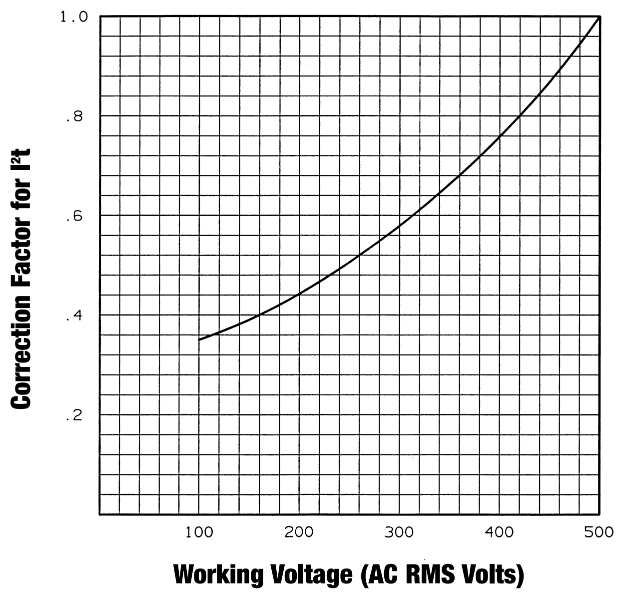


Fig. B

I^2t Data

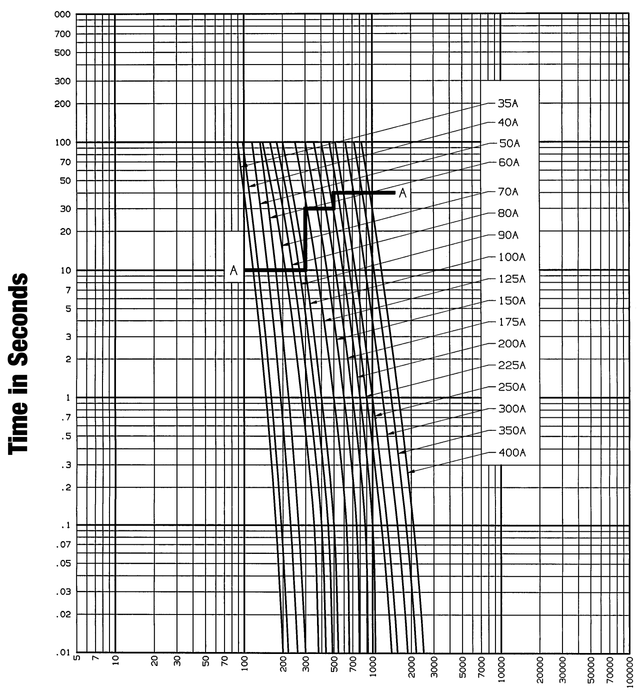
FUSE AMPERE RATING	MELTING ($A^2s \times 10^3$)	I^2t DATA MAX. CLEARING @ 500V AC: 1 FUSE (FIG. A) ($A^2s \times 10^3$)	2 FUSES IN SERIES (FIG. B) ($A^2s \times 10^3$)
35	.09	.53	.26
40	.11	.64	.32
50	.18	1.1	.53
60	.25	1.5	.73
70	.31	1.8	.92
80	.43	2.5	1.3
90	.57	3.3	1.7
100	.74	4.3	2.2
125	.94	5.5	2.8
150	1.5	8.6	4.3
175	2.5	14.5	7.3
200	3.3	19	9.7
225	4.1	23	11
250	4.9	27	14
300	9.2	51	25
350	14.7	81	41
400	16.3	90	45

Clearing I^2t vs. AC Operating Voltage

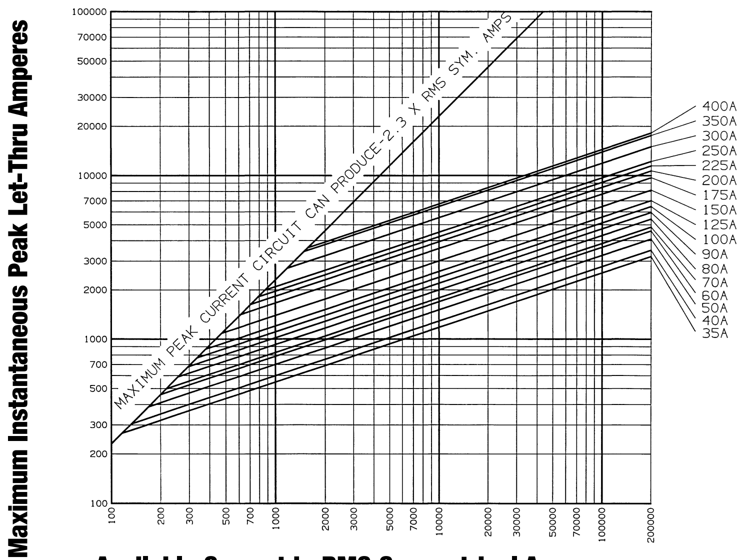


A50QS35 to 400A-4R

Melting Time – Current Data, 500V FUSES



Peak Let-Thru Current Data – A50QS35 to 400-4R, 500 Volts AC



Form 101

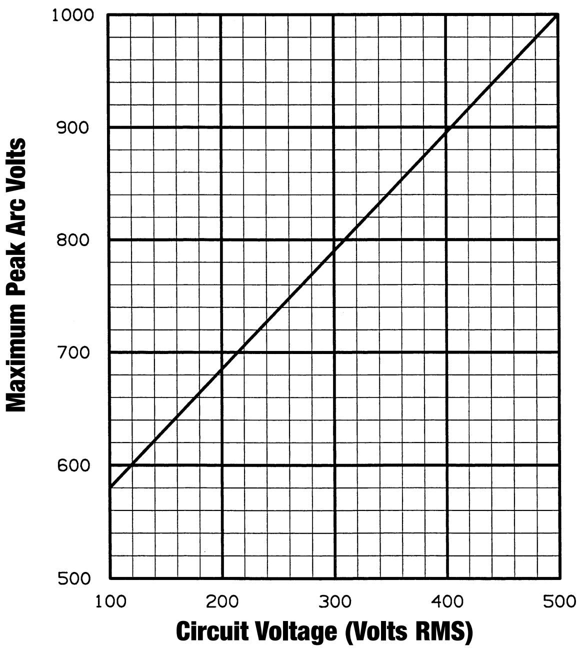
A50QS-4R

Maximum Clearing I²t at 500V DC,100kA, L/R = 11ms

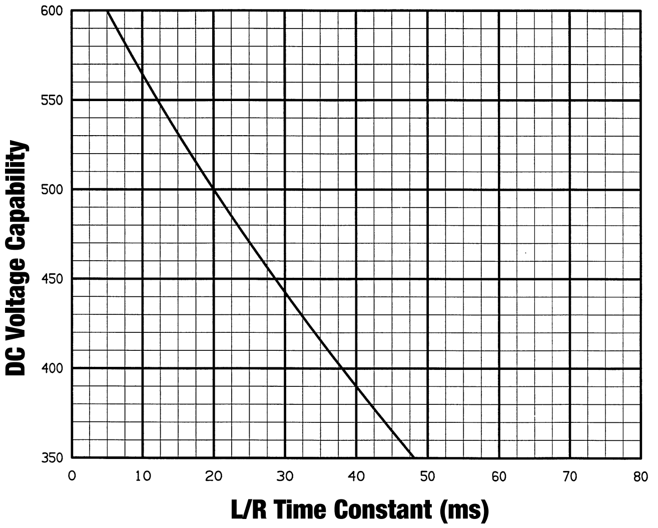
AMPERE RATING	CLEARING I²t ($A^2s \times 10^3$)	AMPERE RATING	CLEARING I²t ($A^2s \times 10^3$)
35	.42	150	6.9
40	.51	175	12
50	.88	200	15.5
60	1.2	225	18
70	1.4	250	22
80	2.0	300	41
90	2.6	350	65
100	3.4	400	72
125	4.4		

MBC @ 500VDC = 7 I_n

Maximum Arc Volts vs. System Voltage



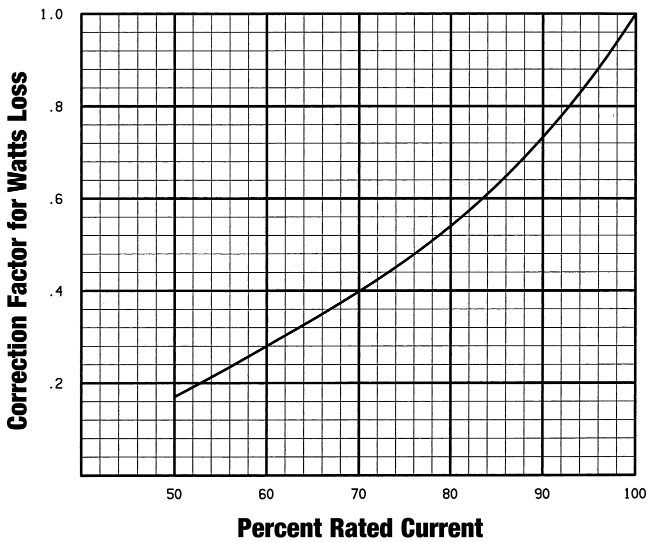
DC Voltage Capability vs. Time Constant



Watts Loss at Rated Current

AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)
35	5	150	26
40	6.1	175	28
50	8.6	200	32
60	9.6	225	37
70	12	250	42
80	13	300	44
90	15	350	49
100	16	400	60
125	22		

Watts Loss vs. % Rated Current



Semiconductor Fuses

American Round Fuses

Form 101 — A50QS



A50QS Amp-trap® Form 101 fuses grew out of the need to improve the overall performance of semiconductor fuses in response to new equipment requirements. The A50QS encompasses the best protection features – lower I^2t to provide better protection for equipment, longer life when subjected to cyclic loading and lower watts loss. A50QS is today's best choice for the protection of dynamic solid state equipment such as motor drives, inverters, UPS, etc.

Features/Benefits

- ✔ **Lowest I^2t** for greatest protection of semiconductor circuits
- ✔ **Low watts loss** for cooler operation
- ✔ **Superior cycling ability** gives an equipment design advantage
- ✔ **State-of-the-art protection** for 500 volt equipment
- ✔ **Ultra compact sizes** allow down-sizing of existing equipment

HIGHLIGHTS:

- ✔ 500V AC/DC Rated
- ✔ Lowest I^2t
- ✔ Low Watts Loss
- ✔ Superior Cycling Ability

APPLICATIONS:

- ✔ Protection of 500V or less motor drives, UPS, inverters, etc.

Ratings

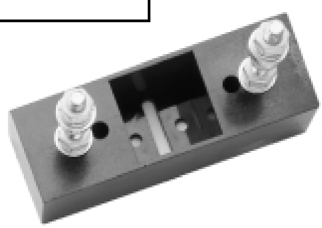
- ✔ **AC:** 35-60A
  500VAC, 100kA I.R.
  70-600A
  500VAC, 200kA I.R.
- ✔ **DC:** 35-600A
  500VDC, 100kA I.R.

Approvals

- ✔ UL Recognized Component
- ✔ AC: UL Guide No. JFHR2
- ✔ DC Tested to UL Standard 198L parameters (70-600A)

Single Pole Fuse Blocks for A50QS Fuses

FUSE AMPERE RATING	MOUNTING TYPE	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
70-200	4	P243E	X222016
225-600	4	P266C	K212897



Cat. Numbering System

A 50 QS 250 - 4

Amp-trap® Fuse	A
Rated Volts - 500	50
Style (Fastest acting, lowest I^2t)	QS
Amperes*	250
Mounting Type* Blades, bolt-in	4

* For ampere ratings and types not listed, ask sales agent.

Semiconductor Fuses

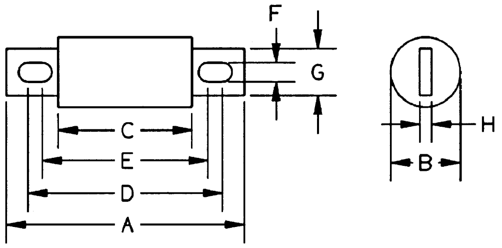
American Round Fuses

Form 101 A50QS

Standard Fuse Ampere Ratings, Catalog and Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	REFERENCE NUMBER	CATALOG NUMBER
35	A50QS35-4	Q214834	175	A50QS175-4	A222663
40	A50QS40-4	Y215853	200	A50QS200-4	T200968
50	A50QS50-4	W217392	225	A50QS225-4	K201512
60	A50QS60-4	A218937	250	A50QS250-4	W211251
70	A50QS70-4	B222664	300	A50QS300-4	D212799
80	A50QS80-4	L201513	350	A50QS350-4	T215343
90	A50QS90-4	X211252	400	A50QS400-4	B216362
100	A50QS100-4	A216361	450	A50QS450-4	E216871
125	A50QS125-4	K218417	500	A50QS500-4	L218418
150	A50QS150-4	P219456	600	A50QS600-4	Q219457

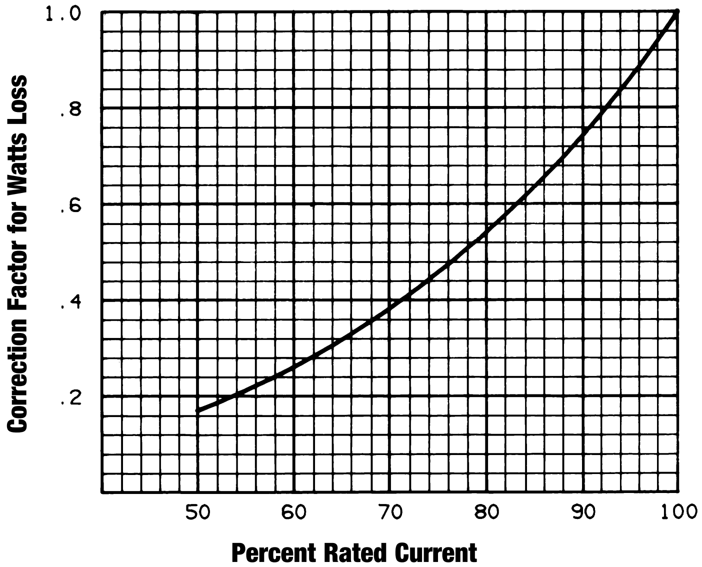
For ampere ratings and styles not listed, call Technical Services.



Dimensions

CATALOG NUMBER	MOUNTING TYPE	DIMENSIONS - INCHES (mm)							
		A	B	C	D	E	F	G	H
A50QS35 to 100	4	3.63 (92.2)	1.00 (25.4)	2.13 (54.1)	2.94 (74.7)	2.75 (69.9)	0.31 (7.9)	0.75 (19.1)	0.13 (3.3)
A50QS125 to 200	4	3.63 (92.2)	1.22 (31.0)	2.13 (54.1)	2.94 (74.7)	2.81 (71.4)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)
A50QS225 to 400	4	4.34 (110)	1.50 (38.1)	2.09 (53.1)	3.41 (86.6)	2.78 (70.6)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)
A50QS450 to 600	4	4.47 (114)	2.00 (50.8)	2.22 (56.4)	3.53 (89.7)	2.91 (73.9)	0.41 (10.4)	1.50 (38.1)	0.25 (6.4)

Watts Loss vs. Percent Rated Current



Watts Loss at Rated Current

AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)
70	12	225	37
80	14	250	41
90	15	300	49
100	17	350	57
125	21	400	65
150	25	450	69
175	29	500	77
200	33	600	92

Correction factor example: At 80% rated current, watts loss equals .54 times watts loss at rated current.

Semiconductor Fuses

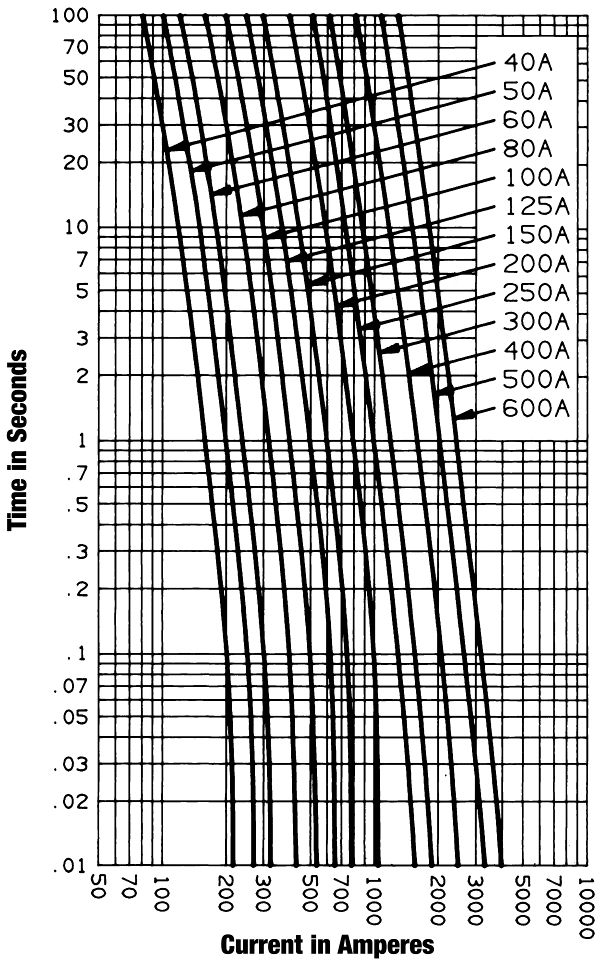
American Round Fuses

Form 101

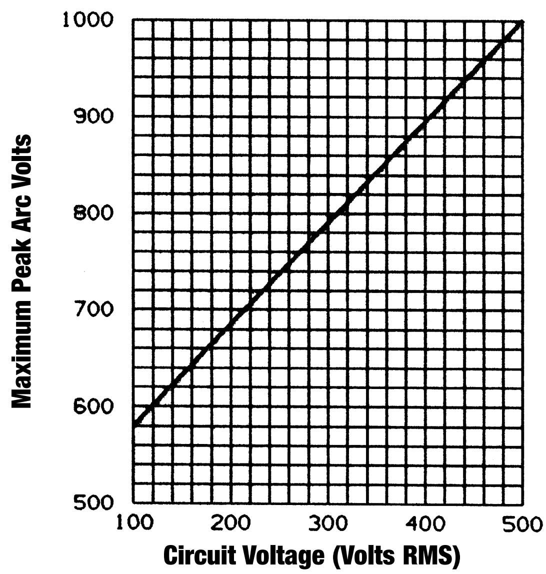
A50QS

A50QS40 to 600

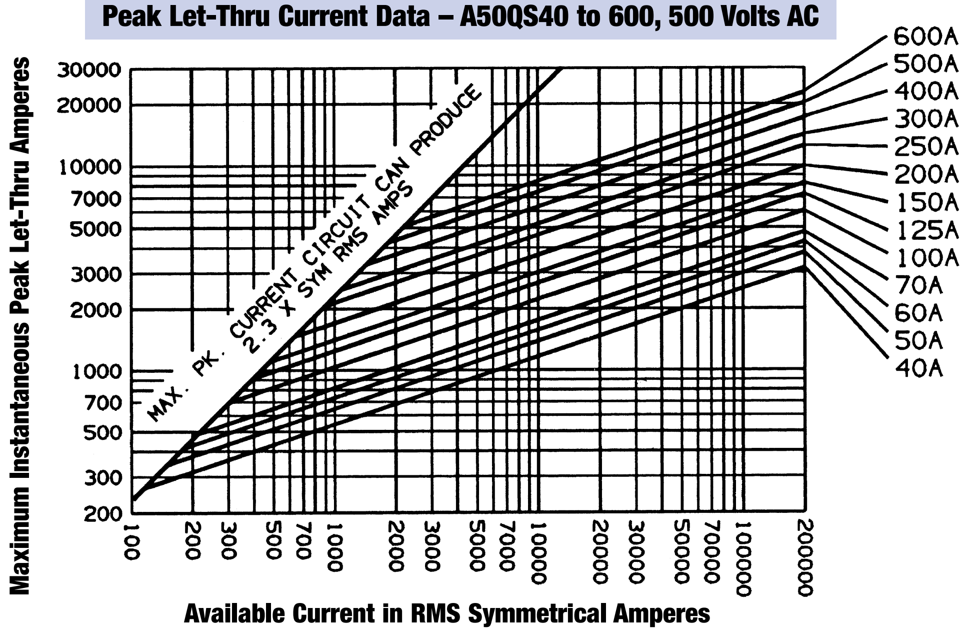
Melting Time – Current Data, 500V Fuses



Maximum Arc Volts vs. System Voltage



Peak Let-Thru Current Data – A50QS40 to 600, 500 Volts AC



Semiconductor Fuses

American Round Fuses

Form 101 A50QS

I^2t Data – 500 Volts AC, 100kA

FUSE AMPERE RATING	I^2t DATA		
	MELTING A²s	CLEARING 1 FUSE (FIG. A) A²s	CLEARING 2 FUSES IN SERIES (FIG. B) A²s
35	90	390	240
40	110	510	310
50	180	800	480
60	250	1150	690
70	340	1600	930
80	450	2000	1200
90	570	2600	1500
100	700	3200	1900
125	1300	5500	3300
150	1800	11000	6400
175	2500	12000	7400
200	3300	14000	8500
225	5100	21000	13000
250	6400	27000	16000
300	9200	38000	23000
350	13000	52000	31000
400	16000	68000	41000
450	21000	87000	52000
500	26000	110000	64000
600	3700	150000	92000

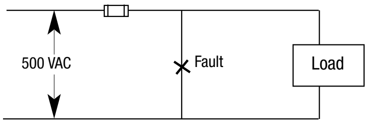


Fig. A

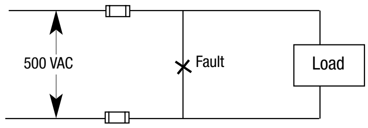
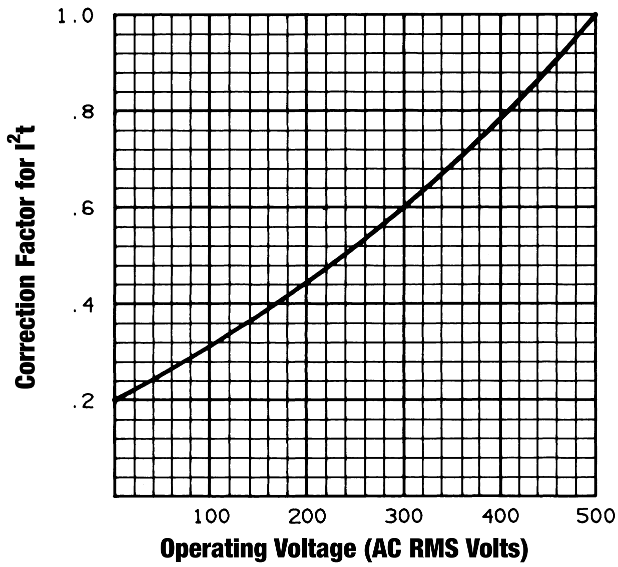


Fig. B

Clearing I^2t vs. AC Operating Voltage

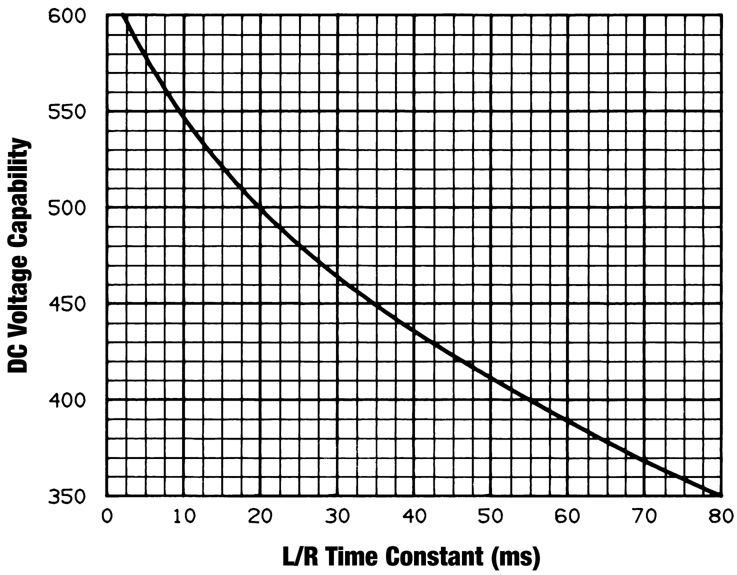


Clearing I^2t at 500V DC, 100kA, L/R = 10 ms

AMPERE RATING	CLEARING I²t (A²s)	AMPERE RATING	CLEARING I²t (A²s)
35	360	175	11000
40	460	200	13000
50	730	225	19000
60	1040	250	24000
70	1400	300	34000
80	1900	350	47000
90	2400	400	61000
100	2900	450	78000
125	5000	500	97000
150	9600	600	140000

DC Application: A50QS Fuses have been designed for both AC and DC operation. A50QS fuses (70-600) have UL Component Recognition at 500V DC and have been tested to circuit parameters as defined in Standard 198L.

DC Voltage Capability vs. Time Constant



Semiconductor Fuses

American Round Fuses

Form 101 — A50P



A50P Amp-trap® Form 101 Semiconductor Protection fuses were developed for DC drives, uninterruptable power supplies and similar applications requiring better protection (lower I^2t) and superior reliability. The A50P continues to be an industry favorite.

Features/Benefits

- ✔ **Low I^2t** minimizes damage to protected components on short circuit
- ✔ **Controlled arc voltage** reduces stress to circuit components during fuse clearing
- ✔ **Choice of mounting types** helps in equipment design

Ratings

- ✔ **AC:** 10-1200A
  500VAC, 100kA I.R.
- ✔ **DC:** 35-1000A
  450VDC, 79kA I.R.
  L/R = 10ms

Approvals

- ✔ UL Recognized Component
- ✔ AC: UL Guide No. JFHR2 (10-800A)
- ✔ DC: UL Guide No. JFHR2 (35-800A)

HIGHLIGHTS:

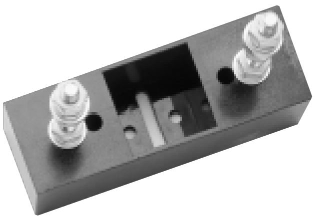
- ✔ Very Fast Acting
- ✔ Current Limiting
- ✔ Low I^2t
- ✔ Indicator Options Available

APPLICATIONS:

- ✔ Protection of DC drives, UPS and other equipment of 500 volts or less

Single Pole Fuse Blocks for A50P Fuses

FUSE AMPERE RATING	MOUNTING TYPE	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
10-30	1	70306	W219071
35-60	1DS	60306J	J211884
35-60	4	P243G	H222762
70-200	4	P243E	X222016
225-600	4	P266C	K212897



Catalog Numbering System

A 50 P 100 - 4 TA

- **Amp-trap® Fuse** — A
- **Rated Volts - 500** — 50
- **Style** — P
- **Amperes*** — 100
- **Mounting Types***
  - Ferrule — 1
  - Blades, bolt-in — 4
- **Integral Blown-Fuse Indicator**
  - Trigger Actuator — TA

* For ampere ratings and types not listed, ask sales agent.

Ferraz Shawmut

Semiconductor Fuses

American Round Fuses

Form 101 A50P

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.
10	A50P10-1	C216869	1	250	A50P250-4	T225693	3
15	A50P15-1	B217903	1	250	A50P250-4TA	E219976	4
20	A50P20-1	Y218935	1	275	A50P275-4	V225694	3
25	A50P25-1	G219978	1	300	A50P300-4	W225695	3
30	A50P30-1	Z222662	1	300	A50P300-4TA	R200966	4
35	A50P35-4	W202281	2	325	A50P325-4	Z223375	3
40	A50P40-4	E211765	2	350	A50P350-4	X225696	3
50	A50P50-4	C212798	2	400	A50P400-4	-	3
60	A50P60-4	P214833	2	400	A50P400-4TA	Q215340	4
70	A50P70-4	Z225698	3	450	A50P450-4	B216868	3
80	A50P80-4	A225699	3	500	A50P500-4	H218415	3
90	A50P90-4	B225700	3	600	A50P600-4	Y222661	3
100	A50P100-4	C225701	3	600	A50P600-4TA	K223178	4
125	A50P125-4	D225702	3	700	A50P700-4	J202270	5
125	A50P125-4TA	R211247	4	700	A50P700-4TA	N212279	6
150	A50P150-4	E225703	3	800	A50P800-4	Q214328	5
175	A50P175-4	F225704	3	800	A50P800-4TA	R215341	6
200	A50P200-4	G225705	3	900	A50P900-4	Z216360	3
200	A50P200-4TA	Z217901	4	1000	A50P1000-4	D219975	3
225	A50P225-4	H225706	3	1200	A50P1200-4	Q200965	3

For ampere ratings and styles not listed, ask sales agent.

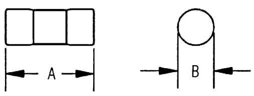


Figure 1

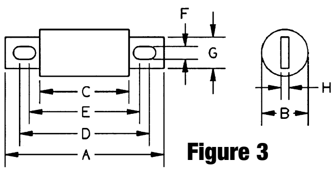


Figure 3

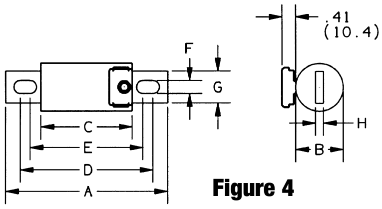


Figure 4

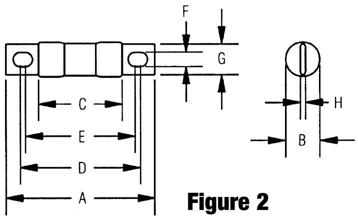


Figure 2

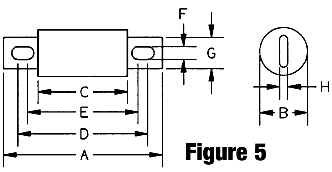


Figure 5

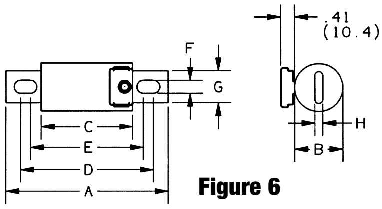


Figure 6

Dimensions

OUTLINE REF.	MOUNTING TYPE	FIG.	DIMENSIONS - INCHES (mm)							
			A	B	C	D	E	F	G	H
A50P10 to 30	1	1	2.00 (50.8)	0.56 (14.2)	-	-	-	-	-	-
A50P35 to 60	1DS*	1	2.25 (57.2)	0.81 (20.6)	-	-	-	-	-	-
A50P35 to 60	4	2	3.19 (81.0)	0.81 (20.6)	1.63 (41.4)	2.50 (63.5)	2.25 (57.2)	0.34 8.6)	0.72 (18.3)	0.13 (3.3)
A50P70 to 100	4	3	3.63 (92.2)	1.00 (25.4)	2.13 (54.1)	2.94 (74.7)	2.81 (71.4)	0.31 (7.9)	0.75 (19.1)	0.13 (3.3)
A50P125 to 200	4, 4TA**	3, 4**	3.63 (92.2)	1.22 (31.0)	2.13 (54.1)	2.94 (74.7)	2.81 (71.4)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)
A50P225 to 400	4, 4TA**	3, 4**	4.34 (110)	1.50 (38.1)	2.09 (53.1)	3.41 (86.6)	2.78 (70.6)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)
A50P450 to 600	4, 4TA**	3, 4**	4.47 (114)	2.00 (50.8)	2.22 (56.4)	3.53 (89.7)	2.91 (73.9)	0.41 (10.4)	1.50 (38.1)	0.25 (6.4)
A50P700 to 800	4, 4TA**	5, 6**	6.47 (164)	2.50 (63.5)	2.22 (56.4)	4.63 (118)	4.31 (109)	0.53 (13.5)	2.00 (50.8)	0.38 (9.7)
A50P900 to 1200	4	3	6.97 (177)	3.00 (76.2)	3.22 (81.8)	4.97 (126)	*** ***	0.63 (16.0)	2.38 (60.5)	0.44 (11.1)

* Use with 60306J fuse block.
** Optional Trigger Actuator (TA)
*** Mounting hole is round, diameter F.

Semiconductor Fuses

American Round Fuses

Form 101 — A60Q



A60Q Amp-trap® Form 101 semiconductor protection fuses feature the only 600 volt AC/DC rating in the industry of similar size (1-1/2" x 13/32") fuses protecting semiconductors. A60Q also has the lowest I^2t of all similar fuses and excellent cycling ability. Applications include inverters and small equipment requiring extremely fast response to faults, without the need to carry sustained heavy overloads.

Features/Benefits

- ✔ **Lowest I^2t** of any fuse this size for greater protection
- ✔ **Excellent cycling ability** gives advantage in equipment design
- ✔ **600V AC/DC rated**

Ratings

- ✔ **AC:** 5-40A
  600VAC, 200kA I.R.
- ✔ **DC:** 5-40A
  600VDC, 100kA I.R.
  L/R = 10ms

Approvals

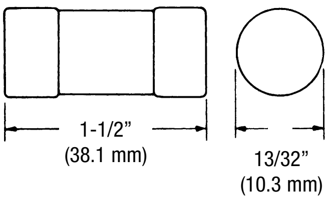
- ✔ UL Recognized Component
- ✔ AC: UL Guide JFHR2
  File E60314
- ✔ DC: UL File E60314

HIGHLIGHTS:

- ✔ 600VAC/DC Rated
- ✔ Extremely Fast Acting
- ✔ Current Limiting
- ✔ Lowest I^2t
- ✔ Excellent Cycling Ability

APPLICATIONS:

- ✔ Protection of small inverters and drives, and equipment requiring the highest degree of protection



Catalog Numbering System

A 60 Q 30 - 2

- **Amp-trap® Fuse** — A
- **Rated Volts - 600** — 60
- **Style** (Fastest acting, lowest I^2t) — Q
- **Amperes** — 30
- **Mounting Type** Ferrule, midget dims. (1-1/2" x 13/32") (10,3x36mm) — 2

FUSE HOLDERS FOR A60Q FUSES

USM Series . . . .ULTRASAFE™ Fuse Holders
303 Series . . . . .Midget Fuse Blocks

Semiconductor Fuses

American Round Fuses

Form 101 A60Q

I^2t at 600VDC,100kA, L/R = 10 ms

AMPERE RATING	CLEARING I^2t (A^2s)
5	40
8	42
10	70
12	90
15	110
20	200
25	260
30	520
35	780
40	1100

I^2t at 600VAC, 100kA

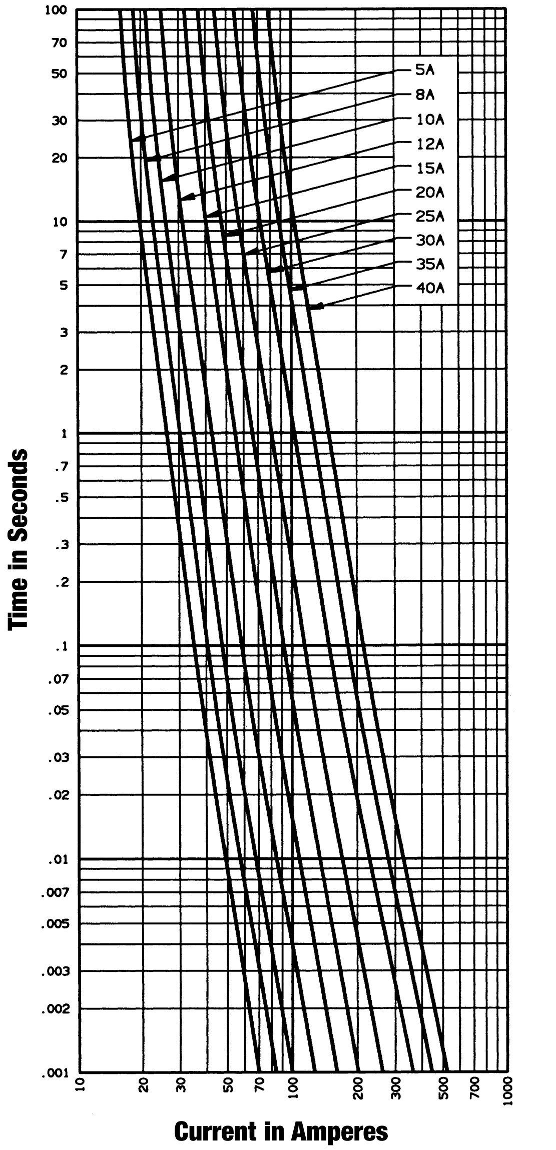
AMPERE RATING	MELTING I^2t (A^2s)	CLEARING I^2t (A^2s)
5	5	60
8	6.5	70
10	10	110
12	17	150
15	26	180
20	41	330
25	69	440
30	132	860
35	197	1300
40	276	1800

Watts Loss Data

AMPERE RATING	WATTS LOSS @ 80% RATING (w)	WATTS LOSS @ 100%RATING (w)
5	0.5	0.7
8	0.7	1.1
10	0.9	1.5
12	1.3	2.0
15	1.9	3.0
20	2.6	4.4
25	2.9	5.3
30	3.0	5.8
35	3.3	6.4
40	3.6	7.0

5 to 40 A

Melting Time – Current Data, 600V Fuses

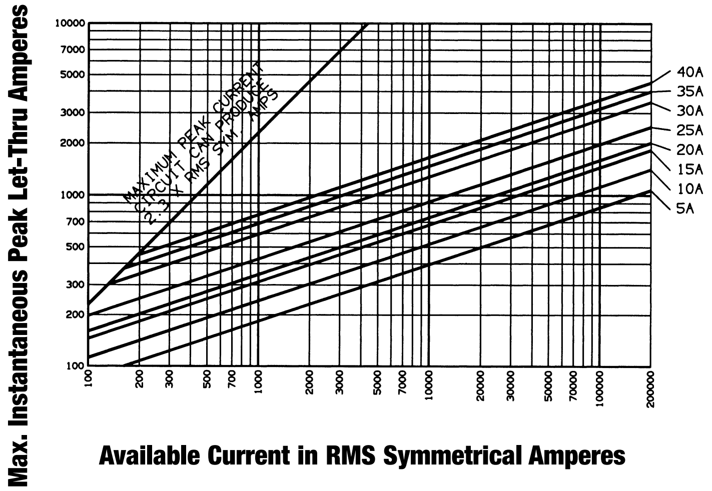


Standard Fuse Ampere Ratings, Catalog and Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
5	A60Q5-2	E217400	20	A60Q20-2	B214338
6	A60Q5-2	E217400	25	A60Q25-2	Z214842
8	A60Q8-2	T218425	30	A60Q30-2	E215859
10	A60Q10-2	Z212289	35	A60Q35-2	J216369
12	A60Q12-2	M212807	40	A60Q40-2	N216879
15	A60Q15-2	X213322			

For ampere ratings and styles not listed, ask sales agent.

Peak Let-Thru Current Data – 5 to 40A, 600 Volts AC



Semiconductor Fuses

American Round Fuses

Form 101 A60X



A60X Amp-trap® Form 101 Semiconductor Protection fuses are popular for the protection of higher voltage heavy rectifiers such as traction rectifiers. They can carry long sustained overloads common with heavy duty apparatus. 700A through 2000A sizes are of compact, hockey-puck design, able to provide high power protection in a small space.

Features/Benefits

- ✔ **Low I^2t** minimizes damage to protected components on short circuit
- ✔ **Controlled arc voltage** reduces stress to circuit components during fuse clearing
- ✔ **Choice of mounting types** helps in equipment design
- ✔ **Spares market only.** For new installations, refer to A70 range

Ratings

- ✔ **AC:** 1-2000A 600V, 100kA I.R.

Approvals

- ✔ UL Recognized Component
- ✔ AC: UL Guide No. JFHR2 (35-800A)

HIGHLIGHTS:

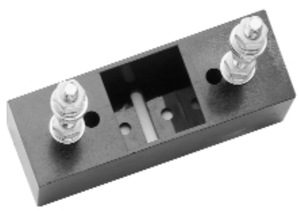
- ✔ Fast Acting
- ✔ Current Limiting
- ✔ Low I^2t
- ✔ Indicator Options Available

APPLICATIONS:

- ✔ Protection of heavy traction and electro-chemical as well as rectifiers and other heavy-duty equipment

Single Pole Fuse Blocks for A60X Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
1-30	60306	V211871
31-60	P243C	M219040
61-100	P243C	M219040
101-200	P243C	M219040
201-400	P266A	Y212380
401-600	P266A	Y212380



Ref. Numbering System

A 60 X 600 - 4 TA

Amp-trap® Fuse	A
Rated Volts - 600	60
Style (Fast acting, low I^2t)	X
Amperes*	600
Mounting Types*	
Ferrule	1
Blades, bolt-in	4
Hockey puck, bolt-in	128
Integral Blown-Fuse Indicator	
Trigger Actuator	TA

* For ampere ratings and types not listed, ask sales agent.

Ferraz Shawmut

Semiconductor Fuses

American Round Fuses

Form 101 A60X

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.
1	A60X1-1	R201518	1	70	A60X70-4	Y214335	3	400	A60X400-4TA	A217396	3
2	A60X2-1	Y212288	1	80	A60X80-4	B217397	3	400	A60X400-4TI	H217909	3
3	A60X3-1	P213821	1	80	A60X80-4TA	Q201517	4	450	A60X450-4	P218421	3
4	A60X4-1	A215349	1	90	A60X90-4	Q201517	3	500	A60X500-4	E222667	3
5	A60X5-1	L217912	1	-	-	-	-	-	-	-	-
6	A60X6-1	Q219986	1	125	A60X125-4	S214836	3	600	A60X600-4	K211770	3
7	A60X7-1	C200976	1	125	A60X125-4TA	D216364	4	600	A60X600-4TA	J212804	4
8	A60X8-1	S201519	1	150	A60X150-4	G216873	3	-	-	-	-
10	A60X10-1	D202633	1	175	A60X175-4	Q223183	3	700	A60X700-4	G216367	5
12	A60X12-1	D211258	1	200	A60X200-4	H211768	3	700	A60X700-128	C215857	7
15	A60X15-1	M211772	1	-	-	-	-	800	A60X800-4	T223186	5
20	A60X20-1	L212806	1	225	A60X225-4	T214837	3	800	A60X800-4TA	A200974	6
25	A60X25-1	W213321	1	250	A60X250-4TA	D218940	4	800	A60X800-128	F218942	7
30	A60X30-1	A214337	1	-	-	-	-	1000	A60X1000-128	S212283	8
35	A60X35-4	Y214841	2	-	-	-	-	1200	A60X1200-128	Q213316	8
40	A60X40-4	M216878	2	300	A60X300-4	N201515	3	1500	A60X1500-128	C218939	8
45	A60X45-4	D217399	2	-	-	-	-	1600	A60X1600-128	L219982	8
50	A60X50-4	S218424	2	350	A60X350-4	X214334	3	1800	A60X1800-128	Z211254	8
55	A60X55-4	Y219464	2	350	A60X350-4TA	X215346	4	2000	A60X2000-128	K213817	8
60	A60X60-4	G222669	2	400	A60X400-4	B215856	3				

For ampere ratings and styles not listed, ask sales agent

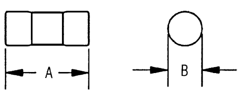


Figure 1

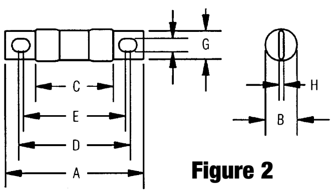


Figure 2

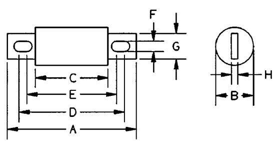


Figure 3

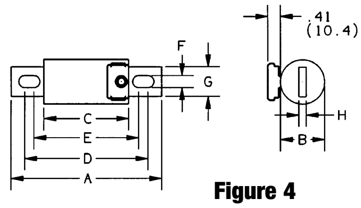


Figure 4

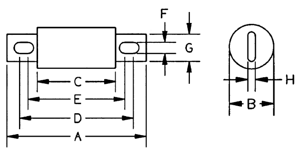


Figure 5

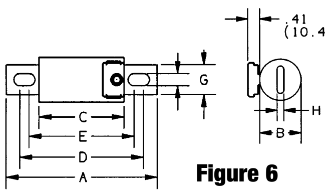


Figure 6

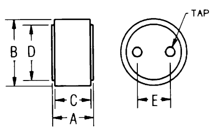


Figure 7

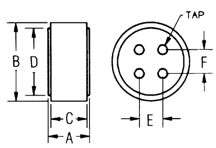


Figure 8

Dimensions

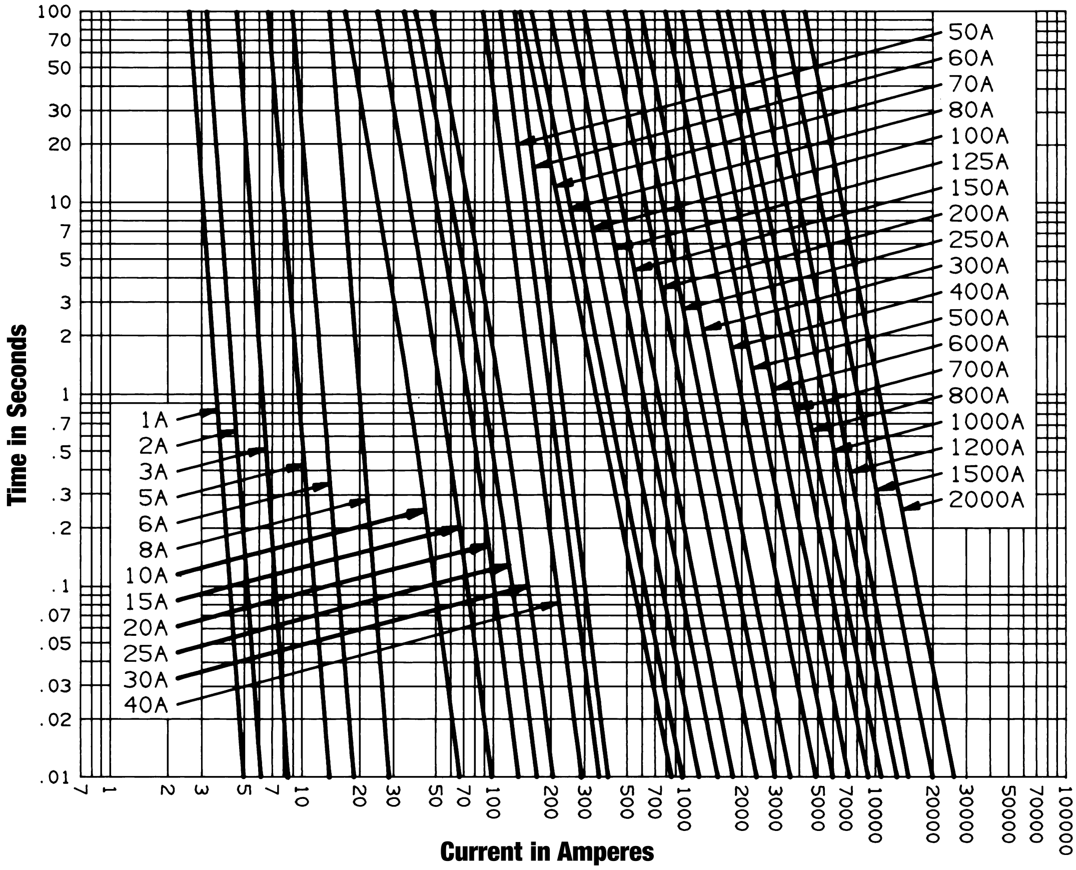
CATALOG NUMBER	MOUNTING TYPE	FIG.	DIMENSIONS - INCHES (mm)								TAP
			A	B	C	D	E	F	G	H	
A60X1 to 30	1	1	5.00 (127)	.81 (20.6)	- -	- -	- -	- -	- -	- -	-
A60X35 to 60	4	2	4.38 (111)	.81 (20.6)	2.78 (70.6)	3.69 (93.7)	3.44 (87.4)	.34 (8.6)	.72 (18.3)	.13 (3.3)	-
A60X70 to 100	4, 4TA	3, 4*	4.41 (112)	1.00 (25.4)	2.91 (73.9)	3.72 (94.5)	3.59 (91.2)	.31 (7.9)	.75 (19.1)	.13 (3.3)	-
A60X125 to 200	4, 4TA	3, 4*	4.41 (112)	1.22 (31.0)	2.91 (73.9)	3.72 (94.5)	3.59 (91.2)	.31 (7.9)	1.00 (25.4)	.19 (4.8)	-
A60X225 to 400	4, 4TA	3, 4*	5.13 (130)	1.50 (38.1)	2.88 (73.2)	4.19 (106)	3.56 (90.4)	.41 (10.4)	1.00 (25.4)	.25 (6.4)	-
A60X450 to 600	4, 4TA	3, 4*	5.13 (130)	2.00 (50.8)	2.88 (73.2)	4.06 (103)	3.69 (93.7)	.41 (10.4)	1.50 (38.1)	.25 (6.4)	-
A60X700 to 800	4, 4TA	5, 6*	7.25 (184)	2.50 (63.5)	3.00 (76.2)	5.94 (151)	4.56 (116)	.53 (13.5)	2.00 (50.8)	.38 (9.7)	- -
A60X700 to 800	128	7	4.00 (102)	3.00 (76.2)	3.75 (95.3)	2.50 (63.5)	1.50 (38.1)	- -	- -	- -	3/8-24-1/2 Deep -
A60X1000 to 1200	128	8	4.00 (102)	3.50 (88.9)	3.75 (95.3)	3.00 (76.2)	1.50 (38.1)	1.50 (38.1)	- -	- -	3/8-24-1/2 Deep -
A60X1500 to 2000	128	8	4.00 (102)	4.50 (114)	3.75 (95.3)	3.75 (95.3)	1.50 (38.1)	1.50 (38.1)	- -	- -	1/2-20-1/2 Deep -

* Optional Trigger Actuator (TA)

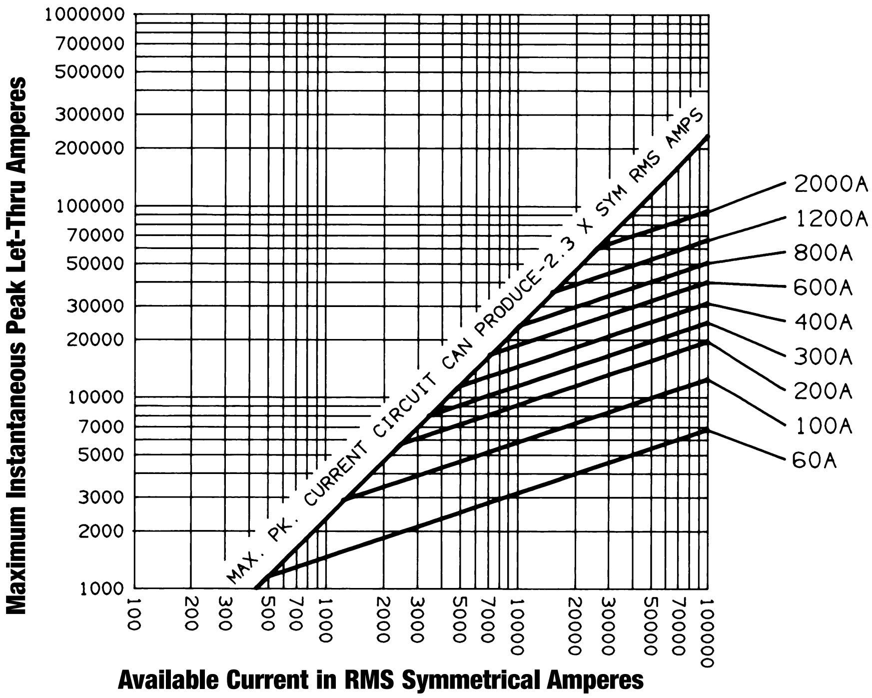
Form 101 A60X

A60X1 to 2000

Melting Time – Current Data, 600V Fuses



Peak Let-Thru Current Data – A60X60 to 2000, 600 Volts AC



Semiconductor Fuses

American Round Fuses

Form 101 A60X

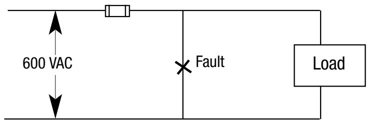


Fig. A

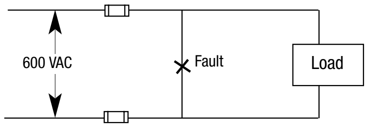


Fig. B

I^2t Data – 600 Volts AC, 100kA

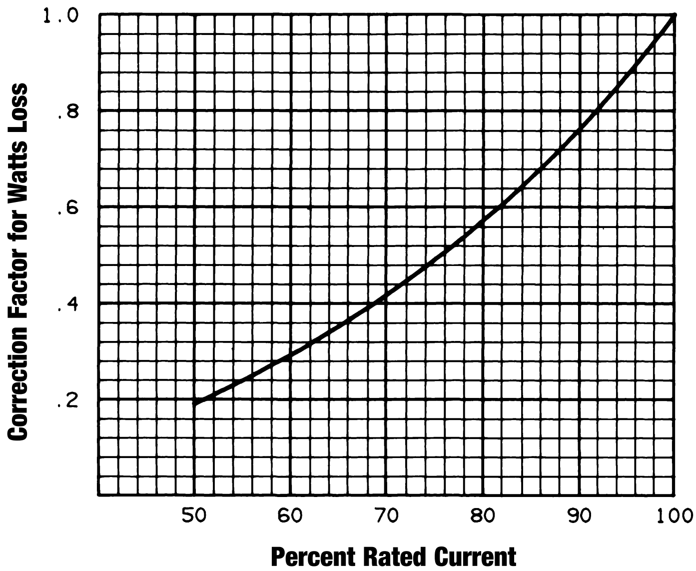
FUSE AMPERE RATING	I^2t DATA		
	MELTING	CLEARING AT 600V	
		1 FUSE (FIG. A) (A^2s)	2 FUSES IN SERIES (FIG. B) (A^2s)
	(A^2s)		
1	.06	.11	.09
2	.22	.45	.36
3	.50	1.0	.80
4	.90	1.8	1.4
5	1.4	2.8	2.2
6	2.0	4.0	3.2
7	2.7	5.4	4.3
8	3.6	7.1	5.7
10	16	40	30
12	22	64	48
15	35	100	70
20	60	170	130
25	95	275	210
30	140	400	290
35	270	1,800	1,200
40	350	2,400	1,600
45	450	3,000	2,000
50	550	3,600	2,400
60	800	5,400	3,600
70	4,000	13,000	9,800
80	5,300	17,000	13,000
90	6,700	22,000	16,000
100	8,300	27,000	20,000
125	13,000	42,000	31,000
150	19,000	60,000	45,000
175	25,000	80,000	61,000
200	33,000	110,000	80,000
225	42,000	140,000	100,000
250	52,000	170,000	125,000
300	75,000	240,000	180,000
350	100,000	340,000	240,000
400	130,000	490,000	320,000
450	170,000	620,000	400,000
500	210,000	770,000	500,000
600	300,000	1,100,000	720,000
700	430,000	1,700,000	1,000,000
800	560,000	2,250,000	1,400,000
1,000	875,000	3,500,000	2,200,000
1,200	1,250,000	5,000,000	3,100,000
1,500	2,000,000	7,900,000	4,900,000
1,600	2,200,000	9,000,000	5,600,000
1,800	2,800,000	11,000,000	7,100,000
2,000	3,500,000	14,000,000	8,900,000

Watts Loss at Rated Current

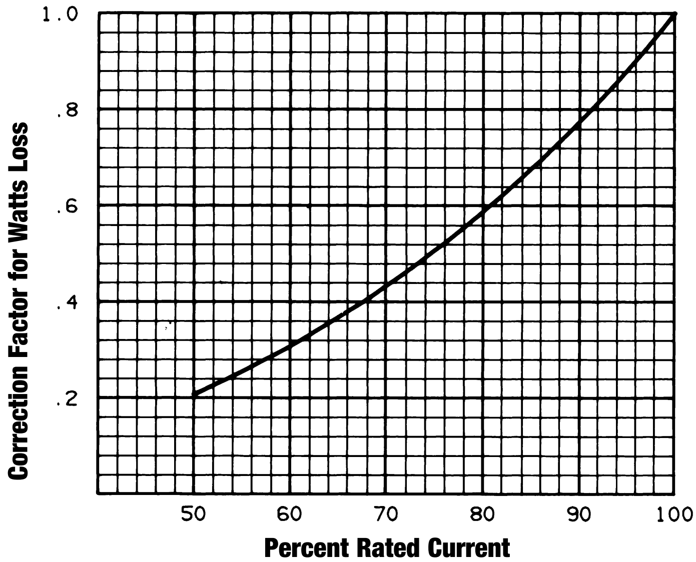
AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)
10	3.8	100	11	700*	57
15	4.5	125	12	700**	52
20	4.0	150	14	800*	67
25	7.3	175	16	800**	59
30	8.7	200	19	1000	72
35	5.2	225	21	1200	86
40	6.3	300	29	1500	107
50	7.4	350	35	1600	117
60	9.1	400	37	1800	133
70	7.6	450	42	2000	148
80	8.9	500	47	2500	183
90	9.7	600	56		

*Type 4 **Type 128

Watts Loss vs. % Rated Current (Types 1 & 4)



Watts Loss vs. % Rated Current (Type 128)



Semiconductor Fuses

American Round Fuses

Ferrule — A70gRB



700 V AC
from 1 to 30 A
Size: 1½"x13/32" (10.3 x 38)

This following fuse preselection table indicates:

- rated current (or rating) I_N
- pre-arcing I^2t (I^2t_p) at 1 ms
- total operating I^2t (I^2tt) at 660 V and 700V, cos φ=0.15, f=50Hz and for a total operating time from 8 to 10 ms
- dissipated power P_N at the rated current I_N, and at 0.8 I_N, in steady state
- nominal breaking capacity, checked by tests made in accordance with American standard.

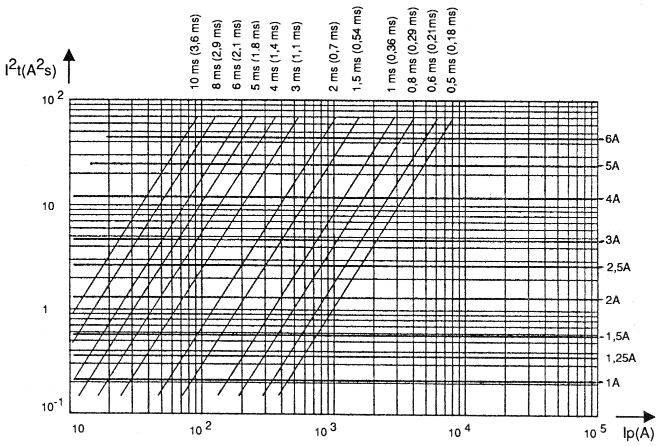
Fuse preselection

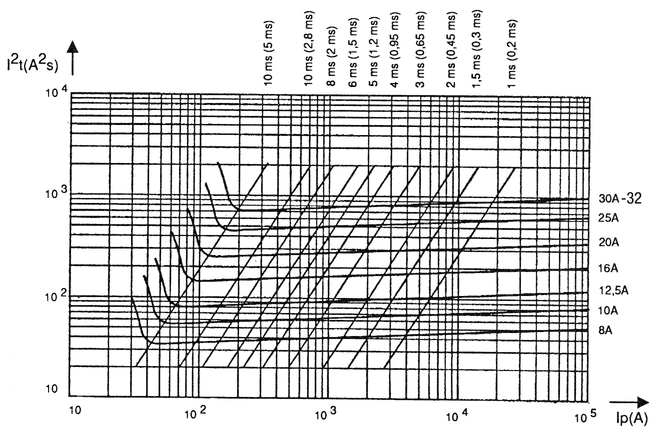
Rated current	Pre-arcing I^2t	Total I^2t (A^2s)		Power losses		Peak Arc voltage at 700VAC	Breaking capacity
I_N (A)	I^2t_p (A^2s)	660V	700V	at I_N	at 0.8 I_N	(V)	I (kA)
1	0,066	0,21	0,32	1	0,57	2700	160 kA 700 V (US)
1,25	0,115	0,36	0,4	1,25	0,7		
1,5	0,185	0,57	0,63	1,5	0,81		
2	0,42	1,3	1,43	2	1,1		
2,5	0,88	2,7	3	2,1	1,15		
3	1,55	4,6	5,1	2,3	1,25		
4	4	12	13,2	2,6	1,35		
5	8,6	25	27,5	2,7	1,4		
6	15	44	48,5	2,9	1,5		
8	3,3	33	36,3	2,4	1,35	1450	
10	5,4	55	60,5	3,4	1,85		
12,5	8,5	82	90,2	3,4	1,9		
16	16	145	160	4,1	2,3		
20	30	250	275	4,3	2,4		
25	58	470	520	4,7	2,7		
30 -32	96	740	815	5	2,9		

Ferrule

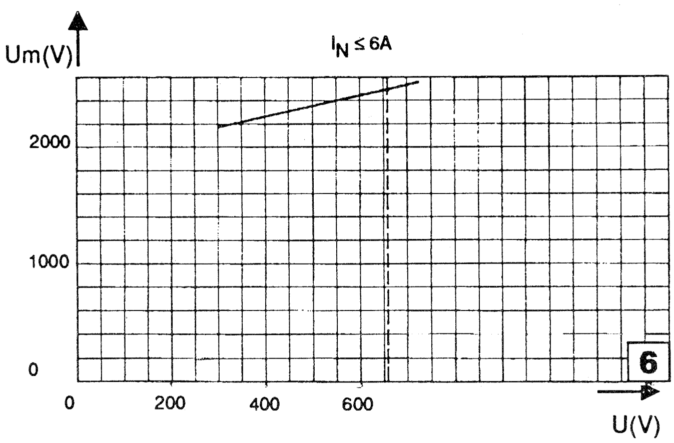
A70gRB

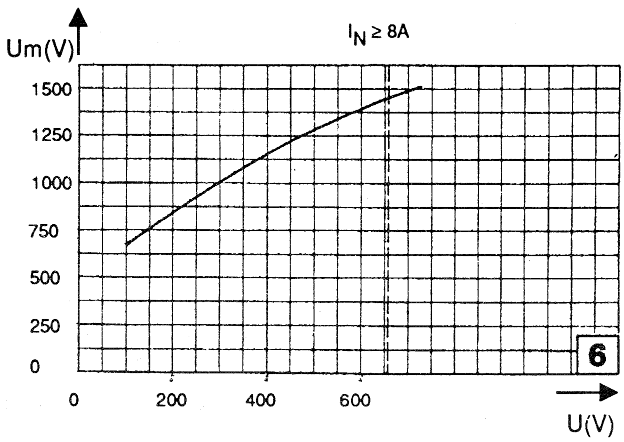
Maximum values of total operating I²t and total operating times



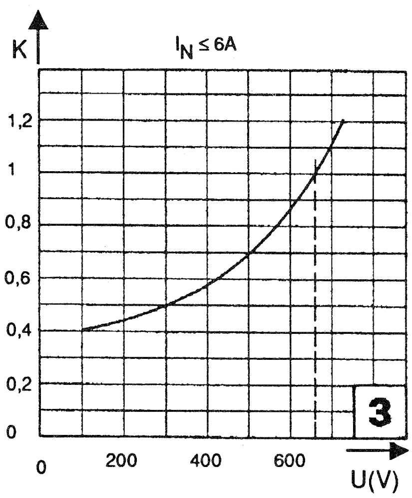


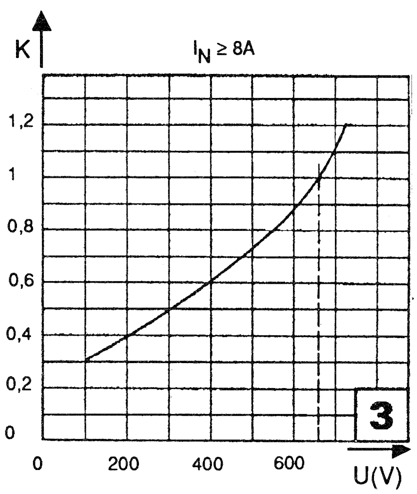
Arc voltage





Multiplier coefficient

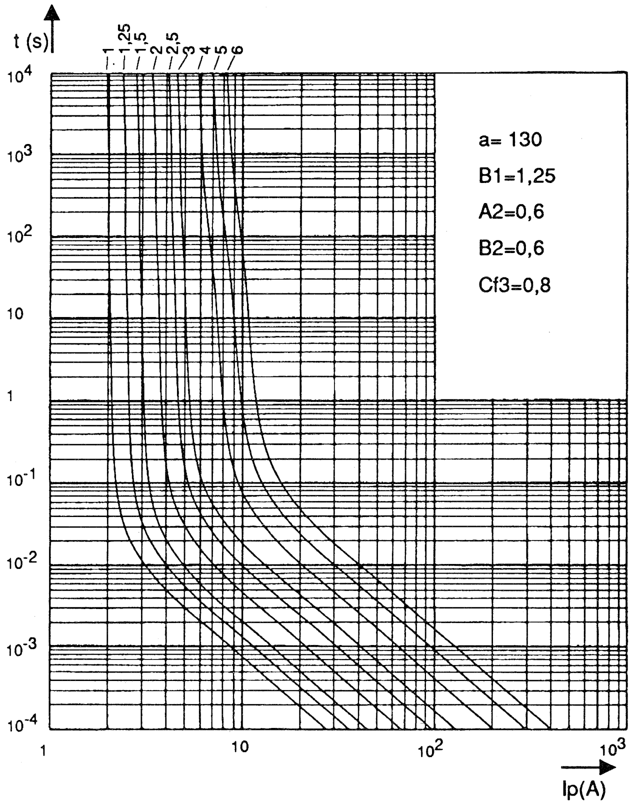




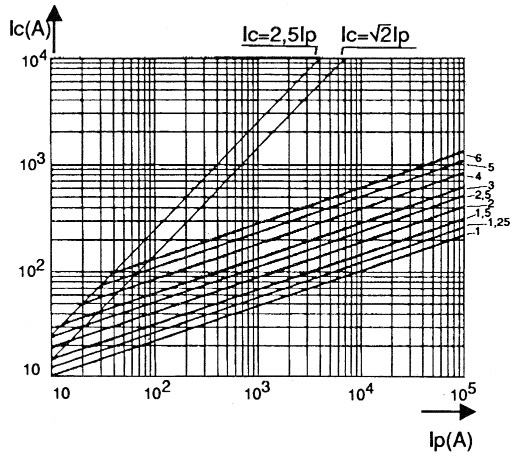
Ferrule

A70gRB

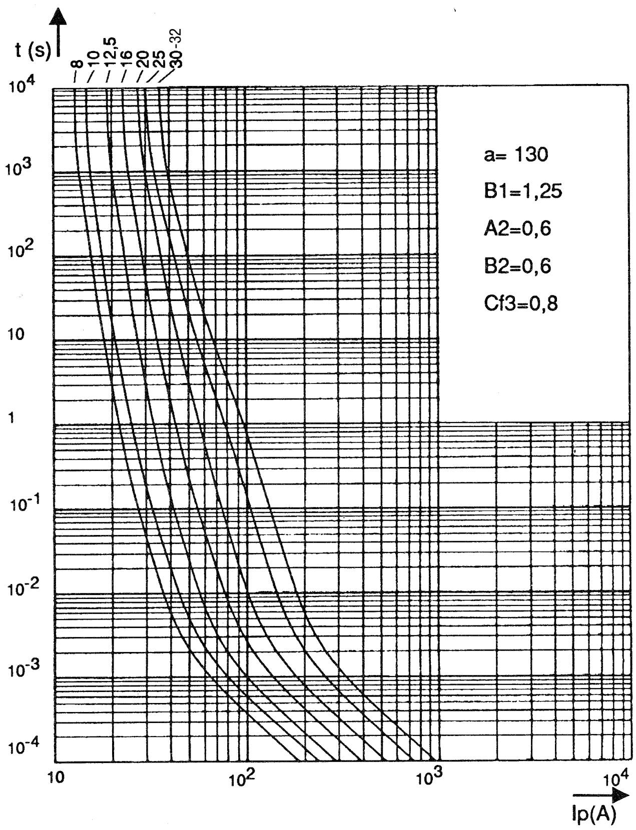
Time-current characteristics (1 to 6 A)



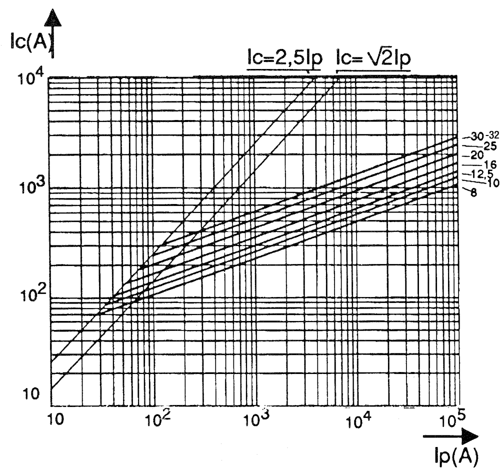
Cut-off characteristics



Time-current characteristics (8 to 30 A)



Cut-off characteristics

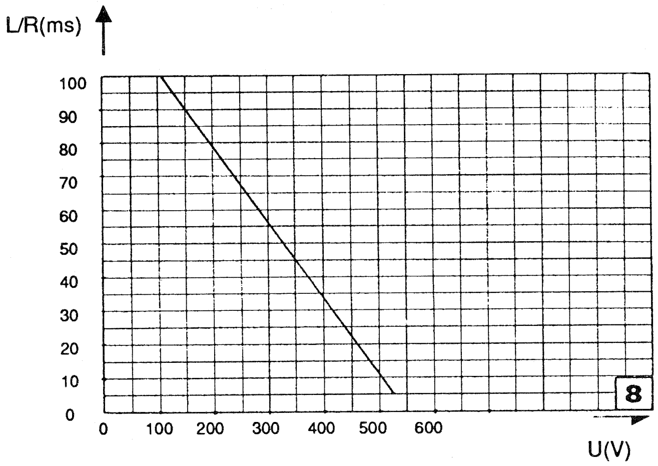


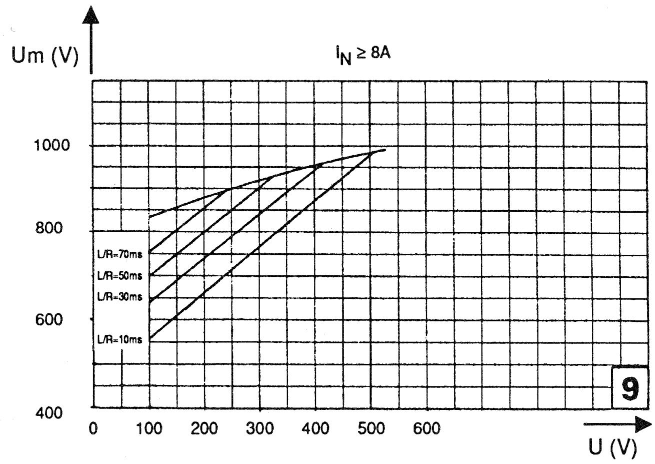
Ferraz Shawmut

Ferrule

A70gRB

DC working voltage possibilities





Top: Curve indicates the maximum time constant L/R of the fault path as a function of the DC voltage U for the rated currents from 1 to 30 A of this range.

Time-current and cut-off characteristics

Previous page - left: Curves show pre-arcing time as a function of the RMS value of pre-arcing current I

Tolerances on this current:

±10% = ratings from 1 to 6 A

±9% = ratings from 8 to 30 A

Fuses with "gR" characteristics can eliminate all overloads. They do not show any minimum breaking capacity but limit currents of non-operation or operation in compliance with standard VDE 636/23.

Previous page - right: Curves indicate peak value Ic that current may reach as a function of prospective fault current Ip.

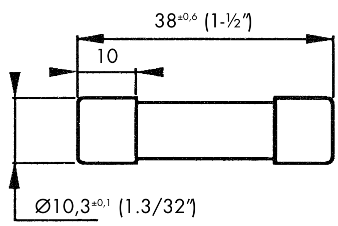
Dimensions / Catalog / Ref. Number

Rating (A)	Catalog Number	Reference Number
1	660 gRB 10-01 A070 gRB 01 T13	W330000
1,25	660 gRB 10-1,25 A070 gRB 1.25 T13	X330001
1,5	660 gRB 10-1,5 A070 gRB 1.5 T13	Y330002
2	660 gRB 10-02 A070 gRB 02 T13	Z330003
2,5	660 gRB 10-2,5 A070 gRB 2.5 T13	A330004
3	660 gRB 10-03 A070 gRB 03 T13	B330005
4	660 gRB 10-04 A070 gRB 04 T13	C330006
5	660 gRB 10-05 A070 gRB 05 T13	D330007
6	660 gRB 10-06 A070 gRB 06 T13	E330008
8	660 gRB 10-08 A070 gRB 08 T13	F330009
10	660 gRB 10-10 A070 gRB 10 T13	G330010
12,5	660 gRB 10-12,5 A070 gRB 12.5 T13	H330011
16	660 gRB 10-16 A070 gRB 16 T13	J330012
20	660 gRB 10-20 A070 gRB 20 T13	K330013
25	660 gRB 10-25 A070 gRB 25 T13	L330014
30	660 gRB 10-30 A070 gRB 30T13	M330015
32	660 gRB 10-33 A070 gRB 33T13	Y330278

Without trip-indicator

Max. weight 10g

Packaging: per 10 pieces



Note: Fuses bear European and American references.
See Fuse Blocks and Fuse Holders - Medium Voltage Fuse Clips

Form 101

A70QS



A70QS Amp-trap® Semiconductor Protection fuses were developed in response to the need for improved overall performance of 700 volt semiconductor fuses for new equipment requirements. A70QS fuses have lower I^2t for better protection, longer life when subjected to cyclic loading, plus lower watts loss. A70QS is the best choice to protect dynamic solid state equipment such as motor drives, UPS, etc.

Features/Benefits

- ✔ **Very Low I^2t** for improved protection of equipment
- ✔ **Superior cycling ability** for long, reliable life on high cyclic loading
- ✔ **Low watts loss** for cooler operation
- ✔ **700V AC/DC rating** gives greater design versatility
- ✔ **Ultra-compact sizes** allow down-sizing of existing equipment

HIGHLIGHTS:

- ✔ 700V AC/DC Rated
- ✔ Very Low I^2t
- ✔ Low Watts Loss
- ✔ Superior Cycling Ability

APPLICATIONS:

- ✔ Protection of 700V or less motor drives, UPS, inverters, etc.

Ratings

- ✔ **AC:** 35-800A
  700VAC, 200kA I.R.
- ✔ **DC:** 35-800A
  700VDC, 100kA I.R.
  L/R = 10ms

Approvals

- ✔ UL Recognized Component, AC/DC
- ✔ AC: Guide No. JFHR2
- ✔ DC: Tested to UL Standard 198L Parameters (35-800A)
- ✔ CSA Certified File LR 12636

Single Pole Fuse Blocks for A70QS Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
35-200	P243C	M219040
225-600	P266A	Y212380

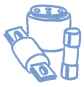


Cat. Numbering System

A 70 QS 150 - 4

Amp-trap® Fuse	A
Rated Volts - 700	70
Style (Fastest acting, lowest I^2t)	QS
Amperes*	150
Mounting Types* Blades, bolt-in	4

* For ampere ratings and types not listed, ask sales agent.



American Round Fuses

Form 101 A70QS

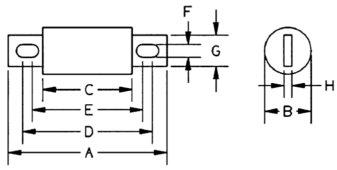
Standard Fuse Ampere Ratings, Catalog and Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
35	A70QS35-4	D202748	100	A70QS100-4	G214343	200	A70QS200-4	V212814	450	A70QS450-4K	H215356
40	A70QS40-4	Y213829	125	A70QS125-4	L215865	200	A70QS200-4K	E213329	500	A70QS500-4	A218431
50	A70QS50-4	T217919	125	A70QS125-4K	Q216375	250	A70QS250-4	L217406	500	A70QS500-4K	R218952
60	A70QS60-4	H219473	150	A70QS150-4	P218950	300	A70QS300-4	Q218951	600	A70QS600-4	Y219993
70	A70QS70-4	B201527	150	A70QS150-4K	F219471	350	A70QS350-4	M211266	600	A70QS600-4K	P222676
80	A70QS80-4	X212816	175	A70QS175-4	A223192	400	A70QS400-4	J214345	700	A70QS700-4	E202772
90	A70QS90-4	K214346	175	A70QS175-4K	J200982	450	A70QS450-4	F214848	800	A70QS800-4	Z213830

For ampere ratings and styles not listed, ask sales agent . Mounting type 4; note exception 4k

Dimensions

CATALOG NUMBER	MOUNTING TYPE	DIMENSIONS - INCHES (mm)							
		A	B	C	D	E	F	G	H
A70QS35 to 100	4	4.38 (111)	1.00 (25.4)	2.88 (73.0)	3.69 (93.6)	3.50 (88.9)	0.31 (7.9)	0.75 (19.0)	0.13 (3.2)
A70QS125 to 200	4	4.38 (111)	1.22 (31.0)	2.88 (73.0)	3.69 (93.6)	3.56 (90.5)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)
A70QS125 to 200	4K	5.09 (129)	1.22 (31.0)	2.88 (73.0)	4.19 (106)	3.50 (88.0)	0.41 (10.3)	1.00 (25.4)	0.19 (4.8)
A70QS225 to 400	4	5.09 (129)	1.50 (38.1)	2.84 (72.2)	4.16 (106)	3.53 (89.7)	0.40 (10.3)	1.50 (38.1)	0.25 (6.4)
A70QS450 to 600	4	5.09 (129)	2.00 (50.8)	2.84 (72.2)	4.16 (106)	3.53 (89.7)	0.41 (10.3)	1.50 (38.1)	0.25 (6.4)
A70QS450 to 600	4K	7.09 (180)	2.00 (50.8)	2.84 (72.2)	6.16 (156)	3.53 (89.7)	0.53 (13.5)	1.50 (38.1)	0.25 (6.4)
A70QS700 to 800	4	7.09 (180)	2.50 (63.5)	2.84 (72.2)	5.28 (134)	4.91 (125)	0.53 (13.5)	2.00 (50.8)	0.38 (9.5)



I^2t Data – 700 Volts AC, 100kA

FUSE AMPERE RATING	I^2t DATA		
	MELTING	CLEARING AT 700V AC	
		1 FUSE (FIG. A)	2 FUSES IN SERIES (FIG. B)
	x 10^3A^2s	x 10^3A^2s	x 10^3A^2s
35	0.13	0.47	0.27
40	0.16	0.58	0.33
50	0.24	0.86	0.49
60	0.32	1.2	0.69
70	0.50	1.8	1.0
80	0.65	2.3	1.3
90	0.83	3.0	1.7
100	1.0	3.6	2.1
125	2.1	6.9	4.0
150	3.3	11	6.3
175	4.2	14	8.0
200	5.9	19	11
225	9.0	30	17
250	12.6	42	24
300	16.7	55	32
350	21.5	72	41
400	29.7	99	57
450	36.7	125	72
500	47.1	160	92
600	65.2	222	127
700	103.6	332	190
800	135.3	433	248

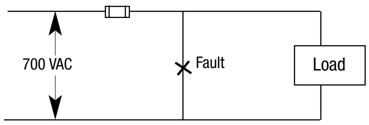


Fig. A

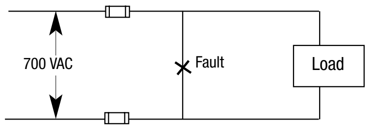
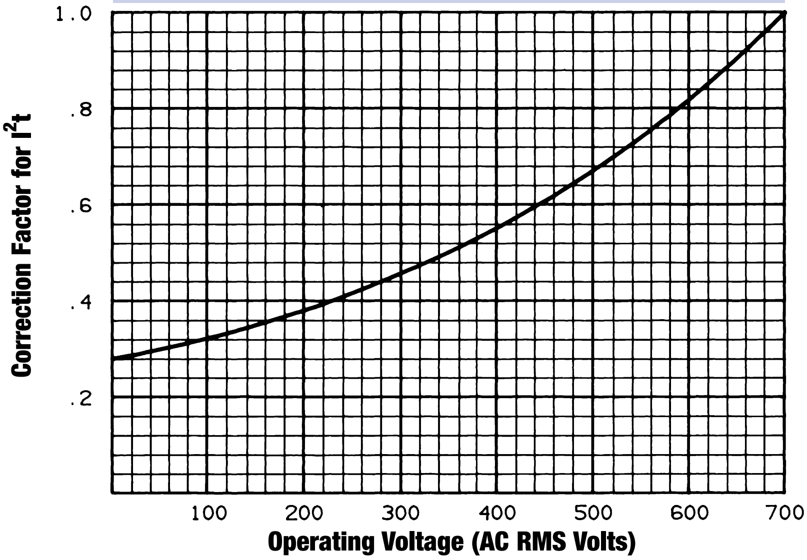


Fig. B

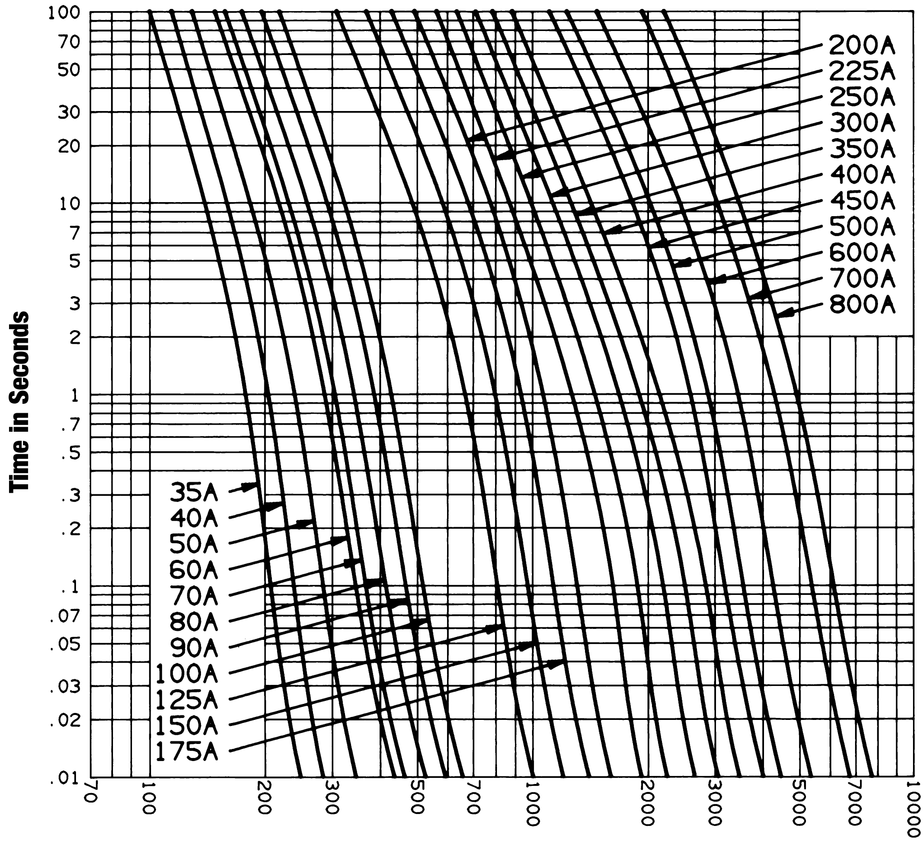
Clearing I^2t vs. AC Operating Voltage



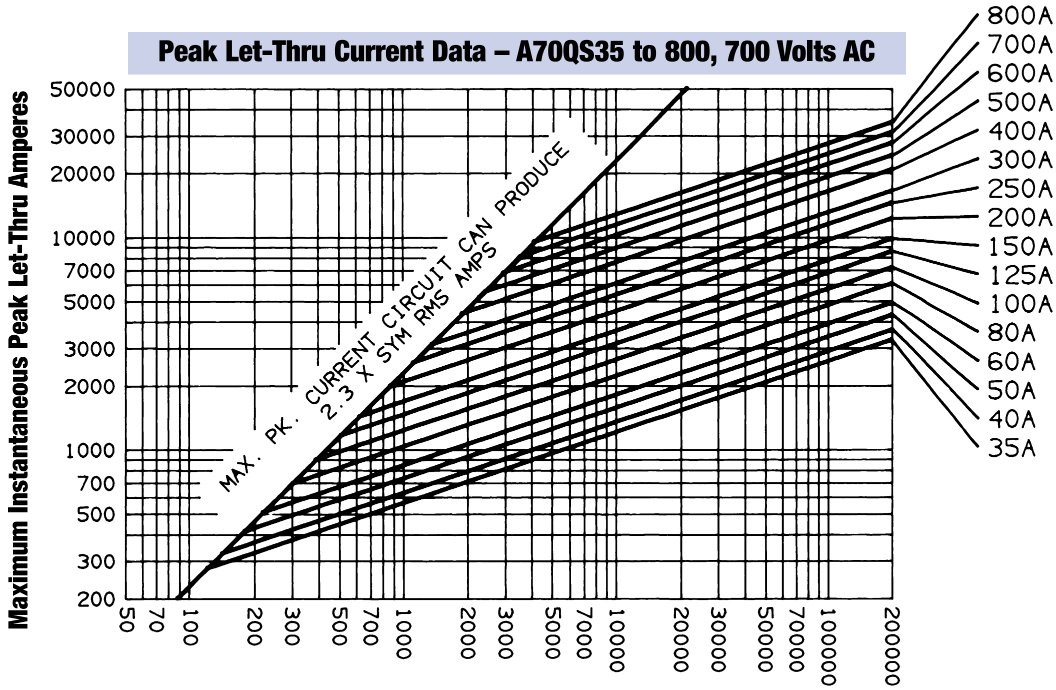
Form 101 A70QS

A70QS35 to 800

Melting Time – Current Data, 700V Fuses



Peak Let-Thru Current Data – A70QS35 to 800, 700 Volts AC

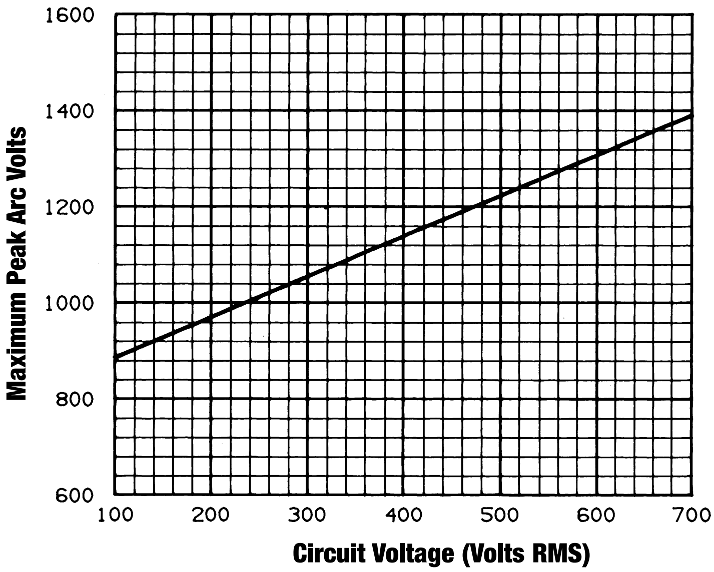


Form 101 A70QS

Clearing I^2t at 700V DC, 100kA, L/R = 10 ms

AMPERE RATING	CLEARING I^2t ($A^2s \times 10^3$)
35	0.25
40	0.35
50	0.60
70	1.3
80	1.8
90	2.4
100	3.1
125	5.3
150	8.1
175	12
200	16
225	21.5
250	27.5
300	42
350	63
400	85
450	115
500	150
600	201
700	325
800	450

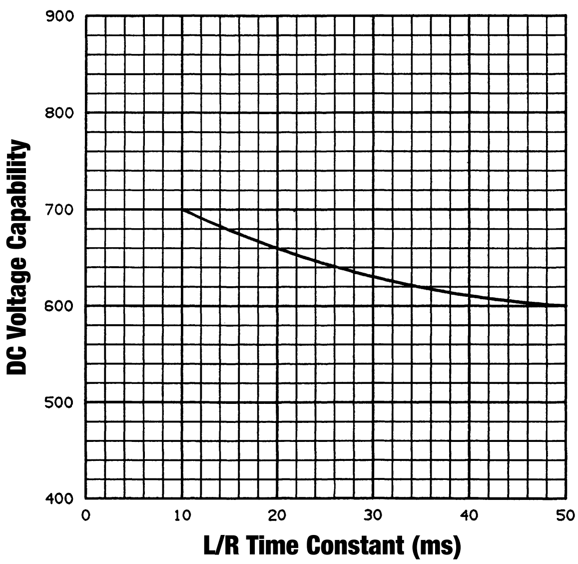
Maximum Arc Volts vs. System Voltage



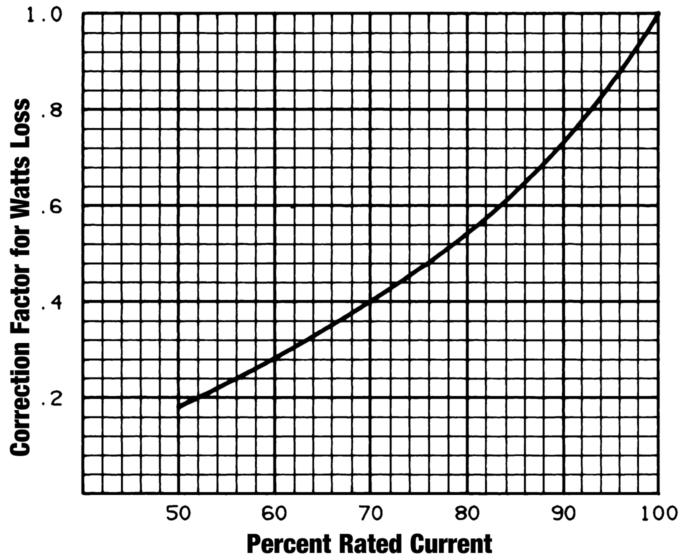
Watts Loss at Rated Current

AMPERE RATING	WATTS LOSS (w)	AMPERE RATING	WATTS LOSS (w)
35	6.2	200	41
40	7.5	225	37
50	9.8	250	42
60	12	300	53
70	15	350	64
80	18	400	75
90	20	450	78
100	24	500	92
125	22	600	116
150	29	700	125
175	35	800	143

DC Voltage Capability vs. Time Constant



Watts Loss vs. % Rated Current



Semiconductor Fuses

American Round Fuses

Form 101 — A70P



A70P Amp-trap® Form 101 semiconductor protection fuses were developed for higher voltage AC and DC drives, UPS systems, reduced voltage motor starters and similar applications where lower I^2t and superior reliability were needed. A70P is a very popular fuse, available in a wide range of ratings.

Features/Benefits

- ✔ **Low I^2t** minimizes damage to protected components on short circuit
- ✔ **Controlled arc voltage** reduces stress to circuit components during fuse clearing
- ✔ **Choice of mounting types** helps in equipment design

Ratings

- ✔ **AC:** 10-1000A 700VAC, 100kA I.R.
- ✔ **DC:** 10-800A 650VDC, 100kA I.R. L/R=10ms

Approvals

- ✔ UL Recognized Component
- ✔ AC: Guide No. JFHR2 (10-1000A)
- ✔ DC: Tested to UL Standard 198L parameters (10-800A)

HIGHLIGHTS:

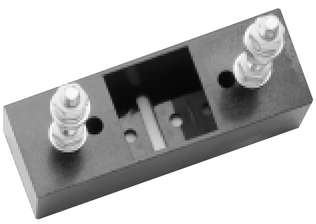
- ✔ Very Fast Acting
- ✔ Current Limiting
- ✔ Low I^2t
- ✔ Indicator Options Available

APPLICATIONS:

- ✔ Protection of 700V or less DC drives, UPS, inverters, reduced voltage starters, etc.

Single Pole Fuse Blocks for A70P Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
10-30 (Type 1)	70306	W219071
31-60	P243C	M219040
61-100	P243C	M219040
101-200	P266A	Y212380
201-400	P266A	Y212380
401-600	P266F	S213410



Catalog Numbering System

A 70 P 300 - 4 TI

Amp-trap® Fuse	A
Rated Volts - 700	70
Style (Faster acting, lower I^2t than X)	P
Amperes*	300
Mounting Types*	
Ferrule	1
Blades, bolt-in	4
Hockey puck, bolt-in	128
Integral Blown-Fuse Indicator	
Trigger Indicator	TI
Trigger Actuator	TA

* For ampere ratings and types not listed, ask sales agent.

Ferraz Shawmut

Semiconductor Fuses

American Round Fuses

Form 101 — A70P

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.
10	A70P10-1	R212811	1	80	A70P80-4	V219990	3	300	A70P300-4	P212809	3
10	A70P10-4	B213326	2	80	A70P80-4TA	L222673	4	350	A70P350-4	C215351	3
15	A70P15-1	F214342	1	80	A70P80-4TI	Z223191	3	400	A70P400-4	L218947	3
15	A70P15-4	C214845	2	90	A70P90-4	J211263	3	400	A70P400-4TA	Y223190	4
20	A70P20-1	D215352	1	100	A70P100-4	J218945	3	400	A70P400-4TI	F200979	3
25	A70P25-1	N216373	1	100	A70P100-4TA	R219987	4	450	A70P450-4	W201522	3
25	A70P25-4	S216883	2	125	A70P125-4	P211774	3	500	A70P500-4	H211262	3
30	A70P30-1	J217404	1	125	A70P125-4TA	N212808	4	600	A70P600-4	H215862	3
30	A70P30-4	R217917	2	150	A70P150-4	A214843	3	600	A70P600-4TA	M216372	4
35	A70P35-4	D214340	3	150	A70P150-4TA	B215350	4	600	A70P600-4TI	R216882	3
40	A70P40-4	Q216881	3	150	A70P150-4TI	F215860	3	700	A70P700-4	M218948	5
40	A70P40-4TA	P217915	4	175	A70P175-4	N217914	3	700	A70P700-4TI	C219468	5
40	A70P40-4TI	W218427	3	200	A70P200-4	K218946	3	800	A70P800-4	G200980	5
50	A70P50-4	W202695	3	200	A70P200-4TA	A219466	4	800	A70P800-4TI	X202696	5
60	A70P60-4	A213325	3	200	A70P200-4TI	S219988	3	900	A70P900-4	D212293	6
60	A70P60-4TA	S213824	4	225	A70P225-4	E200978	3	1000	A70P1000-4	D200977	6
60	A70P60-4TI	E214341	3	250	A70P250-4	V201521	3	1200	A70P1200-4	F211260	7
70	A70P70-4	H217403	3	250	A70P250-4TA	G211261	4				
70	A70P70-4TI	Q217916	3	250	A70P250-4TI	Q211775	3				

For ampere ratings and styles not listed, ask sales agent.

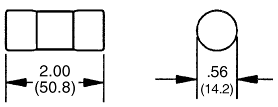


Figure 1

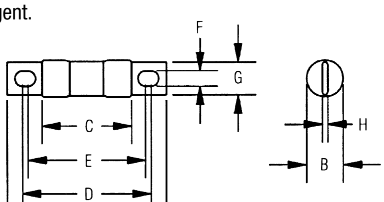


Figure 2

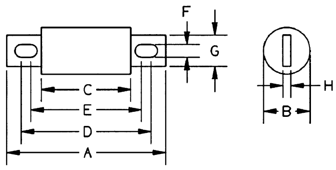


Figure 3

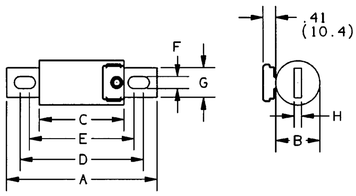


Figure 4

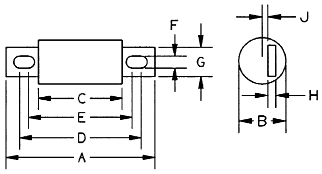


Figure 5

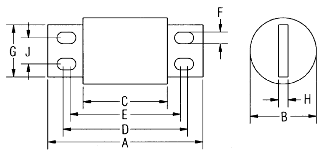


Figure 6

Dimensions

OUTLINE REF.	MOUNTING TYPE	FIG.	DIMENSIONS - INCHES (mm)									
			A	B	C	D	E	F	G	H	J	K
A70P10 to 30	1	1	2.00 (50.8)	.56 (14.2)	- -	- -	- -	- -	- -	- -	- -	
A70P10 to 30	4	2	2.88 (73.2)	.56 (14.2)	1.88 (47.8)	2.50 (63.5)	- -	.27 (6.9)	.41 (10.4)	- -	- -	
A70P35 to 60	4, 4TA*, 4TI	3, 4*	4.38 (111)	1.00 (25.4)	2.88 (73.2)	3.69 (93.7)	3.56 (90.4)	.31 (7.9)	.75 (19.1)	.06 (1.5)	- -	
A70P70 to 100	4, 4TA*, 4TI	3, 4*	4.38 (111)	1.22 (31.0)	2.88 (73.2)	3.69 (93.7)	3.56 (90.4)	.31 (7.9)	1.00 (25.4)	.19 (4.8)	- -	
A70P125 to 200	4, 4TA*, 4TI	3, 4*	5.09 (129)	1.50 (38.1)	2.84 (72.1)	4.16 (106)	3.53 (89.7)	.41 (10.4)	1.00 (25.4)	.25 (6.4)	- -	
A70P225 to 400	4, 4TA*, 4TI	3, 4*	5.09 (129)	2.00 (50.8)	2.84 (72.1)	4.16 (106)	3.53 (89.7)	.41 (10.4)	1.50 (38.1)	.24 (6.4)	- -	
A70P450 to 600	4, 4TA*, 4TI	3, 4*	7.09 (180)	2.50 (63.5)	2.84 (72.1)	5.25 (133)	4.94 (125)	.53 (13.5)	2.00 (50.8)	.38 (9.7)	- -	
A70P700 to 800	4, 4TI	5	6.81 (173)	2.88 (73.2)	3.31 (84.1)	5.31 (135)	- -	.63 (16.0)	2.00 (50.8)	.38 (9.7)	.31 (7.9)	
A70P900 to 1000	4, 4TI	6	7.59 (193)	3.50 (88.9)	3.84 (97.5)	5.97 (152)	5.22 (133)	.63 (16.0)	2.75 (69.9)	.50 (12.7)	1.38 (35.1)	
A70P1200	4	7	10.84 (275.4)	4.5 (114.3)	3.84 (97.6)	6.84 (173.7)	5.84 (148.3)	9.34 (237.3)	9.59 (243.6)	3.5 (88.9)	.63 (15.9)	.75 (19.1)

* Optional Trigger Actuator (TA)

Form 101 A70Q



A70Q Amp-trap® semiconductor protection fuses were developed for inverter applications requiring extremely low I²t. A70Q fuses provide the most responsive protection for applications not required to sustain heavy overloads.

Features/Benefits

- ✔ **Lowest I²t** of any fuse in this voltage rating for best overall protection
- ✔ **700V AC, 650V DC rating** allows protection of greater variety of circuits
- ✔ **Solid fill technology** for extra reliability in performance

Ratings

- ✔ **AC:** 35-600A
  700VAC, 100kA I.R.
- ✔ **DC:** 35-600A
  650VDC, 100kA I.R.
  L/R=10ms

Approvals

- ✔ UL Recognized Component
- ✔ AC: Guide No. JFHR2
- ✔ DC: Tested to UL Standard 198L Parameters (35-600A)

HIGHLIGHTS:

- ✔ Extremely Fast Acting
- ✔ Current Limiting
- ✔ Lowest I²t

APPLICATIONS:

- ✔ Protection of inverters and other equipment requiring the best AC or DC protection in this voltage range

Single Pole Fuse Blocks for A70Q Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK CATALOG NUMBER
35-100	P243C	M219040
125-400	P266A	Y212380
450-600	P266F	S213410



Catalog Numbering System

A 70 Q 500 - 4

Amp-trap® Fuse	**A**
Rated Volts - 700	**70**
Style	**Q**
Amperes*	**500**
Mounting Types* Blades, bolt-in	**4**

* For ampere ratings and types not listed, ask sales agent.

Semiconductor Fuses

American Round Fuses

Form 101 A70Q

Standard Fuse Ampere Ratings

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
35	A70Q35-4	D214846
40	A70Q40-4	T216884
50	A70Q50-4	N218949
60	A70Q60-4	W219991
70	A70Q70-4	R202714
80	A70Q80-4	K211264
90	A70Q90-4	V211779
100	A70Q100-4	Y218429
125	A70Q125-4	D219469
150	A70Q150-4	H200981
175	A70Q175-4	Y202697
200	A70Q200-4	T211778
250	A70Q250-4	S212812
300	A70Q300-4	V213826
350	A70Q350-4	E215353
400	A70Q400-4	K217405
450	A70Q450-4	S217918
500	A70Q500-4	E219470
600	A70Q600-4	M222674

For ampere ratings and styles not listed, call Technical Services.

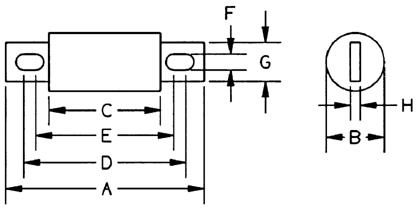


Figure 1

Dimensions

CATALOG NUMBER	MOUNTING TYPE	DIMENSIONS - INCHES (mm)							
		A	B	C	D	E	F	G	H
A70Q35 to 60	4	4.37 (111)	1.22 (31.0)	1.96 (49.8)	3.69 (93.7)	2.91 (73.9)	.34 (8.6)	1.00 (25.4)	.19 (4.8)
A70Q70 to 100	4	4.37 (111)	1.22 (31.0)	1.96 (49.8)	3.69 (93.7)	2.91 (73.9)	.41 (10.4)	1.00 (25.4)	.19 (4.8)
A70Q125 to 200	4	5.09 (129)	1.50 (38.1)	1.96 (49.8)	4.16 (106)	2.91 (73.9)	.41 (10.4)	1.00 (25.4)	.25 (6.4)
A70Q250 to 400	4	5.09 (129)	2.00 (50.8)	1.96 (49.8)	4.00 (102)	2.94 (74.7)	.56 (14.2)	1.50 (38.1)	.25 (6.4)
A70Q450 to 600	4	7.09 (180)	2.50 (63.5)	1.96 (49.8)	5.72 (145)	3.25 (82.6)	.56 (14.2)	2.00 (50.8)	.38 (9.7)

Semiconductor Fuses

American Round Fuses

Form 101

A100P



A100P Amp-trap® Form 101 semiconductor protection fuses are rated 1000V, extending the range of protection for UPS systems, AC and DC drives, reduced voltage motor starters and similar applications where lower I^2t and superior reliability are needed. With ratings from 15 through 1000 amperes, a wide range of high voltage applications can be served.

Features/Benefits

- ✔ **Low I^2t** minimizes damage to protected components on short circuit
- ✔ **Controlled arc voltage** reduces stress to circuit components during fuse clearing
- ✔ **Wide range of ampere ratings**

Ratings

- ✔ **AC:** 15-30A 1000VAC, 100kA I.R.
  35-1000A 1000VAC, 100kA I.R.
- ✔ **DC:** 15-1000A 750VDC, 100kA I.R.

Approvals

- ✔ UL Recognized Component
- ✔ AC: UL Guide No. JFHR2 (60-800A)
- ✔ DC: Ferraz Shawmut Certified

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Current Limiting
- ✔ Low I^2t
- ✔ Optional Trigger Indicator

APPLICATIONS:

- ✔ Protection of UPS systems AC/DC drives, reduced voltage motor starters and other 1000V or less semiconductor devices
- ✔ Spares market only

For new installations, refer to PSC range

Cat. Numbering System

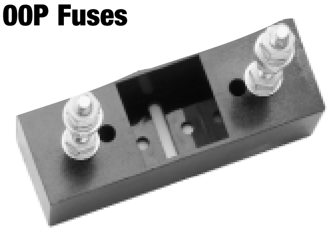
A 100 P 80 - 4 TI

Amp-trap® Fuse	A
Rated Volts - 1000	100
Style (Faster acting, lower I^2t than X)	P
Amperes*	80
Mounting Types*	
Ferrule	1
Blades, bolt-in	4
Integral Blown-Fuse Indicator	
Trigger Indicator	TI

* For ampere ratings and types not listed, ask sales agent.

Single Pole Fuse Blocks for A100P Fuses

FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
35-100	P266G	Z214428
125-400	P266L	J215955



Semiconductor Fuses

American Round Fuses

Form 101 — A100P

Standard Fuse Ampere Ratings, Catalog and Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	OUTLINE FIG.
15	A100P15-1	D222643	1	-	-	-	-	350	A100P350-4	Q201494	2
20	A100P20-1	Y212265	1	100	A100P100-4	A215832	2	-	-	-	-
25	A100P25-1	J216852	1	-	-	-	-	400	A100P400-4	Z212266	2
30	A100P30-1	E218918	1	125	A100P125-4	D218917	2	-	-	-	-
35	A100P35-4	S223162	2	-	-	-	-	500	A100P500-4	W214816	3
40	A100P40-4	A211232	2	150	A100P150-4	R223161	2	-	-	-	-
50	A100P50-4	Q213799	2	-	-	-	-	600	A100P600-4	A217373	3
-	-	-	-	200	A100P200-4	J212781	2	-	-	-	-
60	A100P60-4	G216344	2	-	-	-	-	650	A100P650-4	F218919	4
-	-	-	-	225	A100P225-4	F216343	2	700	A100P700-4	T223163	4
65	A100P65-4	-	2	250	A100P250-4	Z217372	2	800	A100P800-4	B211233	4
-	-	-	-	300	A100P300-4	T219437	2	-	-	-	-
80	A100P80-4	R201495	2	-	-	-	-	1000	A100P1000-4	Y217371	5

For ampere ratings and styles not listed, ask sales agent. All of these catalog and reference numbers are without TI

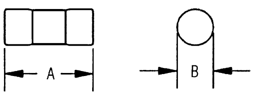


Figure 1

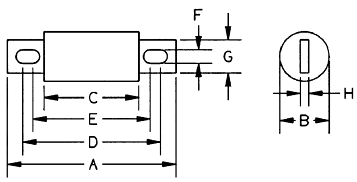


Figure 2

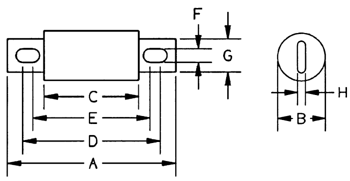


Figure 3

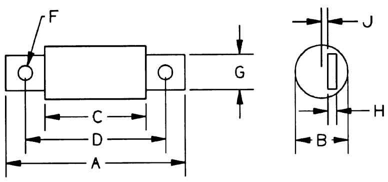


Figure 4

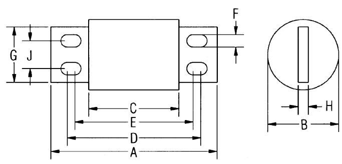


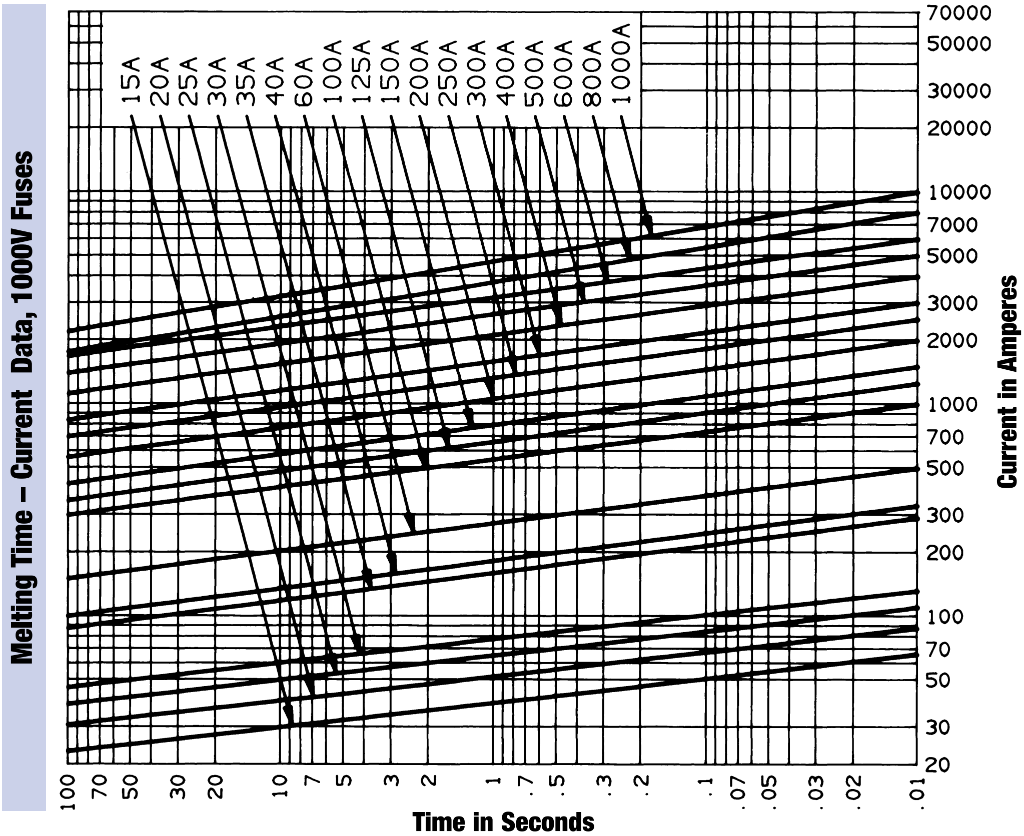
Figure 5

Dimensions

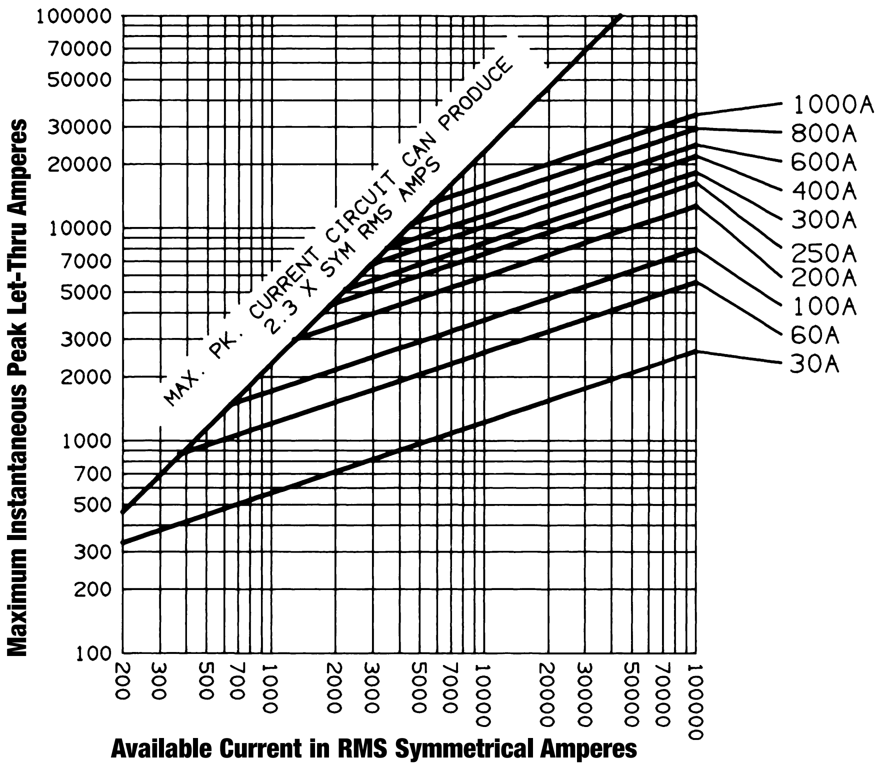
CATALOG NUMBER	MOUNTING TYPE	FIG.	DIMENSIONS - INCHES (mm)								
			A	B	C	D	E	F	G	H	J
A100P15 to 30	1	1	2.63 (66.8)	0.56 (14.2)	- -	- -	- -	- -	- -	- -	- -
A100P35 to 60	4, 4TI	2	5.00 (127)	1.00 (25.4)	3.50 (173)	4.31 (109)	4.19 (106)	0.31 (7.9)	0.75 (19.1)	0.13 (3.3)	- -
A100P65 to 100	4, 4TI	2	5.00 (127)	1.22 (31.0)	3.50 (173)	4.31 (109)	4.19 (106)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)	- -
A100P125 to 200	4, 4TI	2	5.72 (145)	2.00 (38.1)	3.47 (88.1)	4.78 (121)	4.16 (106)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)	- -
A100P225 to 400	4, 4TI	2	5.72 (145)	2.00 (50.8)	3.47 (88.1)	4.78 (121)	4.16 (106)	0.41 (10.4)	1.50 (25.4)	0.25 (6.4)	- -
A100P500 to 600	4, 4TI	3	7.72 (196)	2.50 (63.5)	3.47 (88.1)	5.88 (149)	5.56 (141)	0.53 (13.5)	2.00 (50.8)	0.38 (9.7)	- -
A100P650 to 800	4, 4TI	4	7.44 (189)	2.88 (73.2)	3.94 (100)	5.94 (151)	- -	0.63 (16.0)	2.00 (50.8)	0.38 (9.7)	0.31 (7.9)
A100P1000	4	5	8.22 (209)	3.50 (88.9)	4.47 (114)	6.59 (167)	5.84 (148)	0.63 (16.0)	2.75 (69.9)	0.50 (12.7)	1.38 (35.1)

Form 101 A100P

A100P15 to 1000



Peak Let-Thru Current Data – A100P30 to 1000, 1000 Volts AC



Semiconductor Fuses

American Round Fuses

Form 101 ŌĆö A100P

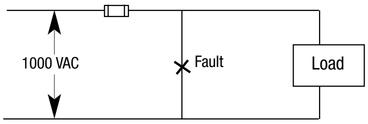
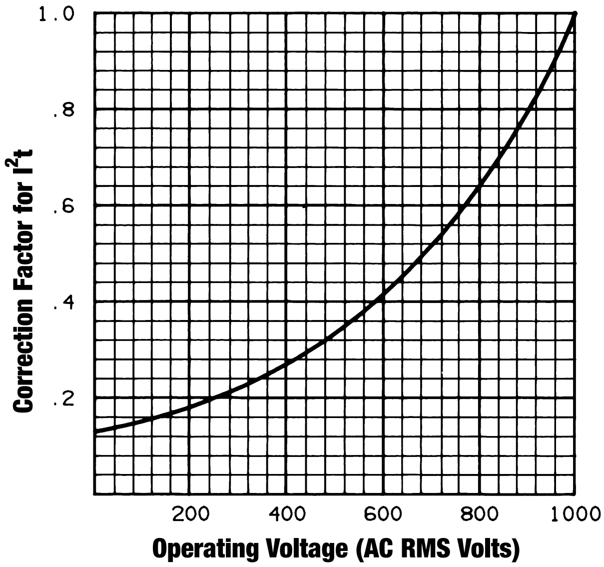


Fig. A

I^2t Data ŌĆō 1000 Volts AC, 100kA

FUSE AMPERE RATING	I^2t DATA MELTING ($A^2s \times 10^3$)	I^2t DATA CLEARING @ 1000VAC FIG. A ($A^2s \times 10^3$)
35	.29	2.2
40	.38	2.9
50	.60	4.5
60	.86	6.5
65	1.0	7.6
70	1.2	8.8
80	1.5	12
100	2.4	18
125	3.8	28
150	5.4	41
200	9.6	72
225	12	91
250	15	110
300	22	160
350	29	220
400	38	290
500	600	450
600	86	650
650	100	760
700	120	880
800	150	1,200
1,000	240	1,900

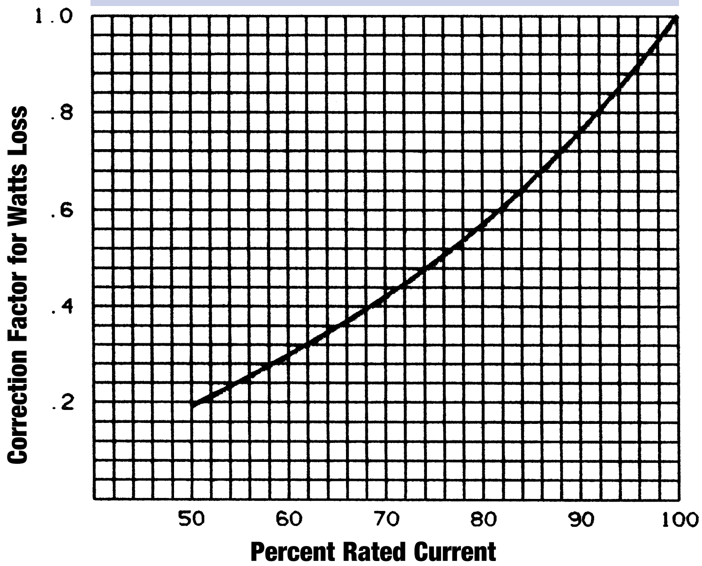
Clearing I^2t vs. AC Operating Voltage



Watts Loss at Rated Current

AMPERE RATING	WATTS LOSS	AMPERE RATING	WATTS LOSS
35	7.3	250	45
40	8.3	300	55
50	11	350	65
60	13	400	70
70	13	500	90
80	14	600	110
100	18	650	120
125	23	700	125
150	28	800	140
200	36	1000	190
225	40		

Watts Loss vs. % Rated Current



American Round Fuses

Form 101 A120X



A120X Amp-trap® Form 101 semiconductor protection fuses, rated 1/2A through 30A, 1200VAC are popular for use in traction drive auxiliary circuits and similar applications. A120X fuses are also suitable for use on 1000VDC auxiliary circuits with low time constants.

Features/Benefits

- ✔ **1000 Volt DC rated** for wide range of circuits
- ✔ **Compact size** fits in where competitive sizes will not fit

Ratings

- ✔ **AC:** 1/2-30A
  1200VAC, 100kA I.R.
- ✔ **DC:** 1/2-30A
  1000VDC, 100kA I.R.
  L/R = 10ms

Approvals

- ✔ Ferraz Shawmut Certified

HIGHLIGHTS:

- ✔ Fast Acting
- ✔ Current Limiting
- ✔ Low I^2t
- ✔ Compact Size

APPLICATIONS:

- ✔ Protection of traction drive auxiliary circuits, etc.

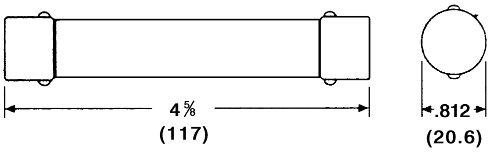
Cat. Numbering System

A 120 X 25 - 1

- **Amp-trap® Fuse** — A
- **Rated Volts - 1200** — 120
- **Style** (Fast acting, low I^2t) — X
- **Amperes*** — 25
- **Common Mounting Type*** Ferrule — 1

* For ampere ratings and types not listed, ask sales agent.

Dimensions - In (mm)



Standard Fuse Ampere Ratings Catalog and Reference Numbers

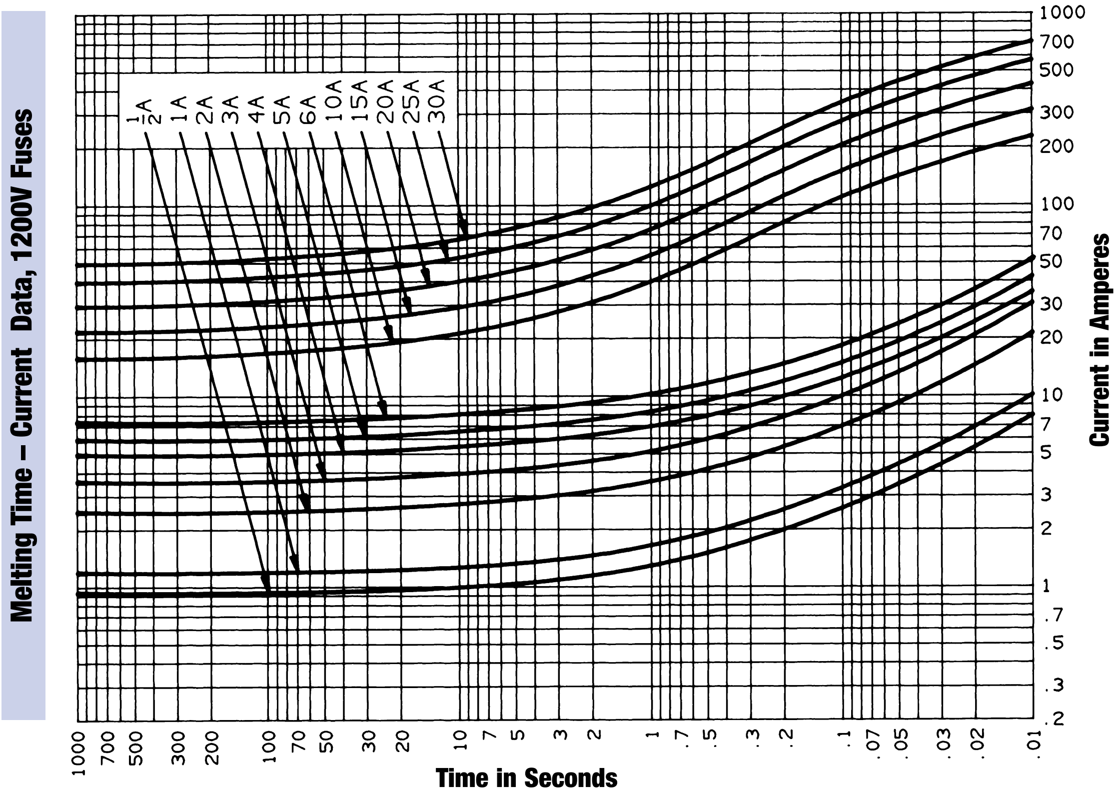
AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
1/2	A120X1/2-1	T218954	6	A120X6-1	W216380
1	A120X1-1	C218433	10	A120X10-1	K219475
2	A120X2-1	E223196	15	A120X15-1	R222678
3	A120X3-1	P211268	20	A120X20-1	M200985
4	A120X4-1	Z212818	25	A120X25-1	E202864
5	A120X5-1	J214851	30	A120X30-1	Z211783

Single Pole Fuse Block for A120X Fuses

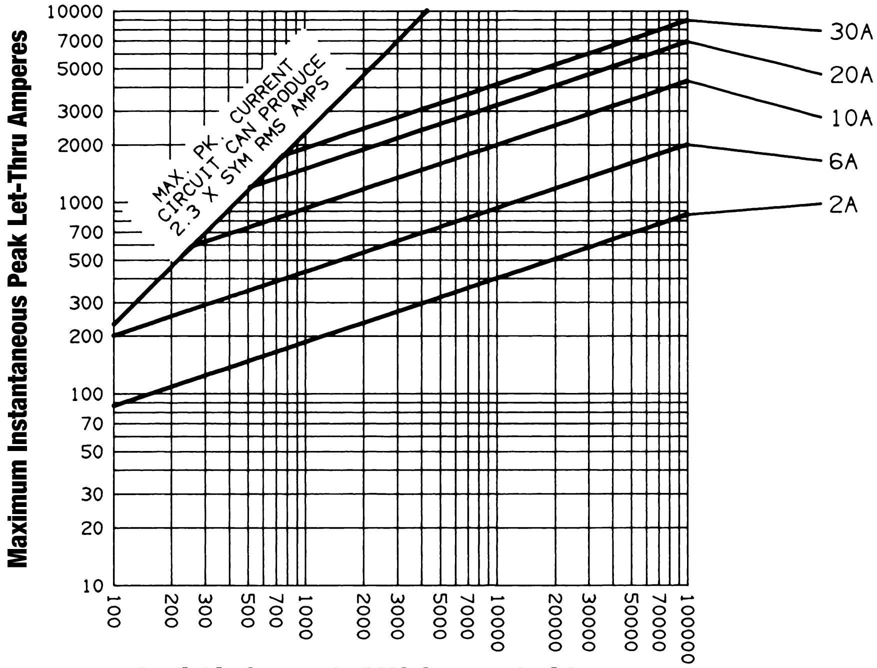
FUSE AMPERE RATING	FUSE BLOCK CATALOG NUMBER	FUSE BLOCK REFERENCE NUMBER
1/2-30	P292	T216976

Form 101 A120X

A120X1/2 to 30



Peak Let-Thru Current Data – A120X2 to 30, 1200 Volts AC



I^2t Data – 1200 Volts AC, 100kA

FUSE AMPERE RATING	I^2t DATA MELTING A^2s	MAXIMUM A^2s
1/2	.10	1.9
1	.40	7.5
2	4.3	30
3	8.9	69
4	10	120
5	18	190
6	29	280
10	500	970
15	1100	2100
20	2000	3700
25	3100	5700
30	4400	8300

PSC

450 TO 700VAC

450 TO 700VAC / 63 TO 2500A.
EXCEPTIONALLY LOW I²T, WATT LOSSES.
NON-MAGNETIC CONSTRUCTION,
HIGHLY RELIABLE LOW VOLTAGE
INDICATOR SYSTEM, CONFORMITY TO UL,
IEC, DIN AND VDE STANDARDS.
INCREASED TECHNICAL PERFORMANCE

- HIGHER RATINGS
- REDUCTION IN VOLUME AND WEIGHT

UL RECOGNIZED



PSC 500 TO 700 VAC - US AND EUROPEAN STANDARD

Size	Nominal Voltage U_N (VAC)		Ampere Rating (A)	Pre-arcing I²t at 1 ms I²t $_p$(10^3 A^2s)	Total I²t at 660V I²t $_t$(10^3 A^2s)	Power P_N (W)		Tested breaking capacity	
	IEC	USA				End contacts	Blades	IEC	USA
			63	0.20	1.10	14	14		
			80	0.33	1.75	19	19		
			100	0.47	2.5	26	26		
			125	0.85	4.5	30	30		
			160	1.60	8.5	37	37		
	660		200	3	15.5	42	43	200 kA / 660 V	200 kA / 700 V
30		700	250	58	30	48	50		
	700		315	12	62	53	55	170 kA / 700 V	170 kA / 750 V
			350	15.50	80	57	60		
			400	23	120	60	65		
			450	26	150	80	88		
			500	41	240	80	88		
			550	52	300	80	90		
			200	2.60	13.5	45	45		
			250	4.70	25	52	52		
			315	7.50	40	65	65		
			350	10.50	55	67	67		
	660		400	19	100	68	68	200 kA / 660 V	200 kA / 660 V
31		700	450	26.50	140	70	70		
	700		500	37	195	70	72	170 kA / 700 V	170 kA / 750 V
			550	52	280	70	75		
			630	75	390	75	85		
			700	95	490	85	5		
			800	140	800	105	120		
			400	15	80	72	75		
			450	2	115	77	80		
	660	700	500	28	145	85	90	200 kA / 660 V	200 kA / 700 V
	700		550	37	195	90	95		
			630	54	280	95	105	170 kA / 700 V	170 kA / 750 V
			700	76	400	100	110		
32			800	115	600	110	120		
	660	700	900	170	900	110	1 25	200 kA / 660 V	200 kA / 700 V
	690+6%		1000	240	1250	115	135		
	600	650	1100	270	1670	140	165	160 kA / 600 V	160 kA / 650 V
	550	600	1250	410	2400	150	180	150 kA / 550 V	150 kA / 600 V
	500	550	1400	555	3400	160	190	130 kA / 500 V	130 kA / 550 V
			1600	870	5300	1 65	195		
	450	500	1800	1050		195	230	110 kA / 450 V	110 kA / 500 V
			500	19	100	105	105		
			550	27	140	105	110		
	660		630	40	210	110	120	200 kA / 660 V	200 kA / 660 V
		700	700	55	300	115	125		
	700		800	95	490	120	130	170 kA / 700 V	170 kA / 750 V
			900	135	700	1 20	135		
			1000	170	900	1 35	155		
			1100	240	1260	135	160		
33	660	700	1250	350	1850	150	180	200 kA / 660 V	200 kA / 700 V
	690+6%		1400	480	2500	160	200		
			1500	500	3000	190	230		
	600	650	1600	555	3300	210	240	160 kA / 600 V	160 kA /650 V
			1800	720	4450	230	260		
	550	600	2000	950	5600	250	290	150 kA / 550 V	150 kA / 600 V
	500	550	2250	1250	7600	280	330	130 kA / 500 V	130 kA / 550 V
	450	500	2500	1870		280	330	110 kA / 450 V	110 kA / 550 V
			1000	110	590	165			
	660		1250	220	1100	190		170 kA / 700 V	170 kA / 750 V
2 x 32	690 + 6%	700	1400	300	1600	200			
			1600	450	2400	220			
	660	700	1800	700	3500	225		200 kA / 660 V	200 kA / 700 V
			2000	950	5000	235			
			1250	160	850	230			
			1400	225	1200	240			
	660	700	1600	375	1900	250		200 kA / 660 V	200 kA / 700 V
2 x 33			1800	530	2800	250			
			2000	700	3500	280		170 kA / 600 V	170 kA / 600 V
	600	650	2200	950	5000	280			
			2500	1400	7500	310		200 kA / 600 V	200 kA / 600 V
			2800	1900	10000	330			

This fuse preselection table indicates, for each size:

- rated current (or rating) I_N
- pre-arcing I²t (I²t $_p$) at 1 ms
- total operating I²t (I²tt) at 660 V, f=50Hz cos φ=0.15, and for a total operating time from 8 to 10 ms
- dissipated power P_N at the rated current I_N, and at 0.8 I_N, in steady state
- breaking capacity at various voltages, checked by tests made in accordance with IEC and American standards.

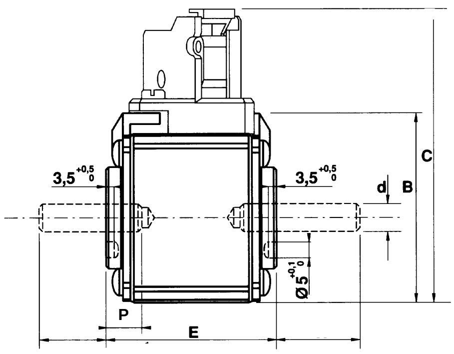
American standard PSC 500 TO 700VAC End contacts

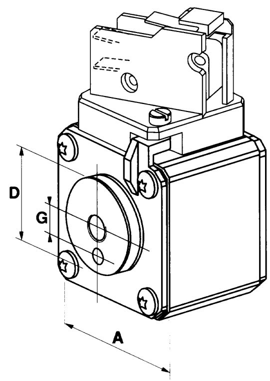
Size	Catalog Number	Reference Number	Weight (g)	Packaging
30	A070 URD 30 TTI 0063	A301967	245	3
	A070 URD 30 TTI 0080	V301962		
	A070 URD 30 TTI 0100	W300744		
	A070 URD 30 TTI 0125	G300708		
	A070 URD 30 TTI 0160	N300576		
	A070 URD 30 TTI 0200	P300577		
	A070 URD 30 TTI 0250	Q300578		
	A070 URD 30 TTI 0315	R300579		
	A070 URD 30 TTI 0350	S300580		
	A070 URD 30 TTI 0400	T300581		
	A070 URD 30 TTI 0450	V300582		
	A070 URD 30 TTI 0500	W300583		
	A070 URD 30 TTI 0550	X300584		
31	A070 URD 31 TTI 0200	A300472	370	3
	A070 URD 31 TTI 0250	B300473		
	A070 URD 31 TTI 0315	C300474		
	A070 URD 31 TTI 0350	D300475		
	A070 URD 31 TTI 0400	E300476		
	A070 URD 31 TTI 0450	F300477		
	A070 URD 31 TTI 0500	G300478		
	A070 URD 31 TTI 0550	H300479		
	A070 URD 31 TTI 0630	J300480		
	A070 URD 31 TTI 0700	K300481		
	A070 URD 31 TTI 0800	L300482		
32	A070 URD 32 TTI 0400	Q300463	510	3
	A070 URD 32 TTI 0450	N300461		
	A070 URD 32 TTI 0500	P300462		
	A070 URD 32 TTI 0550	R300464		
	A070 URD 32 TTI 0630	S300465		
	A070 URD 32 TTI 0700	T300466		
	A070 URD 32 TTI 0800	V300467		
	A070 URD 32 TTI 0900**	W300468	600	3
	A070 URD 32 TTI 1000**	X300469		
	A065 URD 32 TTI 1100**	M301081		
	A060 URD 32 TTI 1250**	N301082		
	A055 URD 32 TTI 1400**	P301083		
	A055 URD 32 TTI 1600**	Q301084		
	A050 URD 32 TTI 1800**	R301085		
33	A070 URD 33 TTI 0500	X300446	790	3
	A070 URD 33 TTI 0550	Y300447		
	A070 URD 33 TTI 0630	Z300448		
	A070 URD 33 TTI 0700	A300449		
	A070 URD 33 TTI 0800	T300443		
	A070 URD 33 TTI 0900	B300450		
	A070 URD 33 TTI 1000	C300451		
	A070 URD 33 TTI 1100	D300452		
	A070 URD 33 TTI 1250**	E300453	910	3
	A070 URD 33 TTI 1400**	F300454		
	A065 URD 33 TTI 1500**	F302064		
	A065 URD 33 TTI 1600**	S301086		
	A065 URD 33 TTI 1800**	T301087		
	A060 URD 33 TTI 2000**	V301088		
	A055 URD 33 TTI 2250**	W301089		
	A050 URD 33 TTI 2500**	Y300838		

American standard PSC 500 TO 700VAC End contacts

Size	A	B	C	D	$E^{\pm1}$	d	$G^{\pm0.1}$	$P^{\pm0.1}$
30	40 1-19/32″	46.5 1-27/32″	82 3-7/32″	26 1″	50.6 2″	5/16-18″	9 23/64″	6 15/64″
31	51 2″	56.5 2-7/32″	91 3-37/64″	30 1-3/16″	50.6 2″	5/16-18″	9 23/64″	9 23/64″
32	60 2-3/8″	65.5 2-37/64″	100 3-15/16″	38 ; 42 ** 1-1/2″ ; 1-21/32″ **	50.6 2″	3/8-16″	15 19/32″	9 23/64″
33	74.5 2-15/16″	79.5 3-1/8″	114 4-1/2″	46 ; 52 ** 1-13/16″ ; 2-1/16 **	50.6 2″	1/2-13″	15 19/32″	9 23/64″

Note:
dimensions in mm
dimensions in inches





Threaded studs and microswitches are supplied separately (see pages 422 and 420)

American standard PSC 500 TO 700VAC Blades

Rated voltage as per American standard.

Size	Description [1]	Reference number K	Reference number L	Reference number LL	Weight (g)	Packaging
	A 070 URD 30 ... I 0050	E301925	A301921			
	A 070 URD 30 ...I 0063	B300128	M300138			
	A 070 URD 30 ...I 0080	C300129	N300139			
	A 070 URD 30 ...I 0100	D300130	P300140			
	A 070 URD 30 ...I 0125	E300131	Q300141			
	A 070 URD 30 ...I 0160	F300132	R300142			
	A 070 URD 30 ...I 0200	G300133	S300143			
30	A 070 URD 30 ...I 0250	H300134	T300144		290	3
	A 070 URD 30 ...I 0315	J300135	V300145			
	A 070 URD 30 ...I 0350	K300136	W300146			
	A 070 URD 30 ...I 0400	L300137	X300147			
	A 070 URD 30 ...I 0450	T301064	K300527			
	A 070 URD 30 ...I 0500	V301065	L300528			
	A 070 URD 30 ...I 0550	W301066	M300529			
	A 066 URD 30 ...I 0630	-	P302003			
	A 070 URD 31 ...I 0160	F300385	D301924	C301923		
	A 070 URD 31 ...I 0200	S300028	V300697	J300158		
	A 070 URD 31 ...I 0250	T300029	W300698	K300159		
	A 070 URD 31 ...I 0315	V300030	X300699	L300160		
	A 070 URD 31 ...I 0350	R300050	Y300700	M300161		
31	A 070 URD 31 ...I 0400	W300031	Z300701	N300162		
	A 070 URD 31 ...I 0450	X300032	A300702	P300163	430	3
	A 070 URD 31 ...I 0500	Y300033	B300703	Q300164		
	A 070 URD 31 ...I 0550	Z300034	C300704	R300165		
	A 070 URD 31 ...I 0630	A300035	D300705	S300166		
	A 070 URD 31 ...I 0700	B300036	E300706	T300167		
	A 070 URD 31 ...I 0800	A301070	F300707	J300526		
	A 070 URD 32 ...I 0400	Z300195	J300204			
	A 070 URD 32 ...I 0450	A300196	K300205			
	A 070 URD 32 ...I 0500	B300197	L300206			
	A 070 URD 32 ...I 0550	C300198	M300207			
	A 070 URD 32 ...I 0630	D300199	N300208		590	
	A 070 URD 32 ...I 0700	E300200	P300209			
32	A 070 URD 32 ...I 0800	F300201	Q300210			
	A 070 URD 32 ...I 0900**	G300202	R300211			3
	A 070 URD 32 ...I 1000**	H300203	S300212			
	A 065 URD 32 ...I 1100**	-	B301071			
	A 060 URD 32 ...I 1250**	-	C301072		660	
	A 055 URD 32 ...I 1400**	-	D301073			
	A 055 URD 32 ...I 1600**	-	E301074			
	A 050 URD 32 ...I 1800**	-	F301075			
	A 070 URD 33 ...I 0500	W300238	K300228			
	A 070 URD 33 ...I 0550	X300239	L300229			
	A 070 URD 33 ...I 0630	Y300240	M300230			
	A 070 URD 33 ...I 0700	Z300241	N300231			
	A 070 URD 33 ...I 0800	A300242	P300232		860	
33	A 070 URD 33 ...I 0900	B300243	Q300233			
	A 070 URD 33 ...I 1000	C300244	R300234			
	A 070 URD 33 ...I 1100	D300245	S300235			3
	A 070 URD 33 ...I 1250	E300246	T300236			
	A 070 URD 33 ...I 1400	F300247	V300237			
	A 065 URD 33 ...I 1600**	E302063	G301076			
	A 065 URD 33 ...I 1800**	-	H301077			
	A 060 URD 33 ...I 2000	-	J301078		1070	
	A 055 URD 33 ...I 2250	-	K301079			
	A 050 URD 33 ...I 2500	-	L301080			

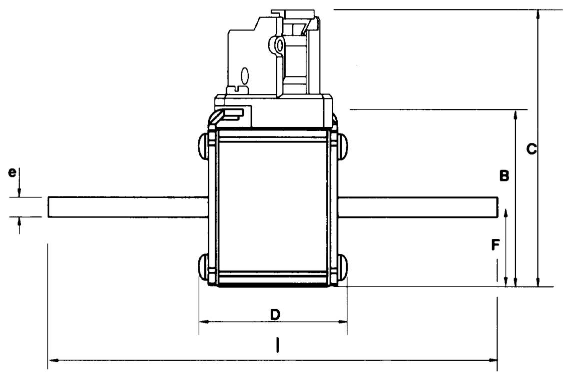
[1] Blank to be completed with K for short blades, L or LL for long blades.

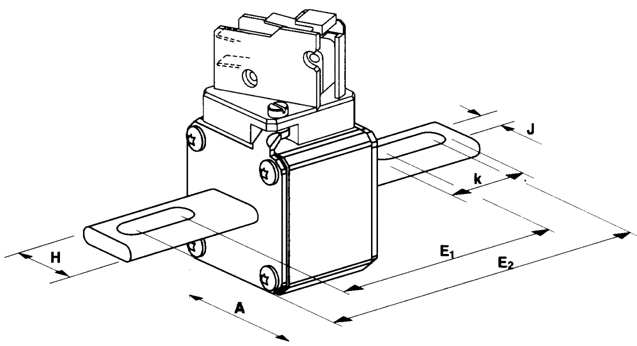
American and European Square-body Fuses

American standard PSC 500 TO 700VAC Blades

	Size	A	B	C	D	$E_1^{\pm1,1}$	$E_2^{\pm1,1}$	F	H	J	K	L	e
K	30	40 *1-19/32”*	46,5 *1-27/32”*	82 *3-7/32”*	47,5 *1-7/8”*	68 *2-11/16”*	107 *4-7/32”*	21 *53/64”*	25 *1”*	10,5 *13/32”*	30 *1-3/16”*	129 *5-5/64”*	6 *15/64”*
	31	51 *2”*	56,5 *2-7/32”*	91 *3-37/64”*	47,5 *1-7/8”*	68 *2-11/16”*	107 *4-7/32”*	25,5 *1”*	25 *1”*	10,5 *13/32”*	30 *1-3/16”*	129 *5-5/64”*	6 *15/64”*
	32	60 *2-3/8”*	65,5 *2-37/64”*	100 *3-15/16”*	47,5 *1-7/8”*	74,5 *2-59/64”*	109 *4-9/32”*	30 *1-3/16”*	32 *1-1/4”*	14,6 *9/16”*	32 *1-1/4”*	134 *5-9/32”*	6 *15/64”*
	33	74,5 *2-15/16”*	79,5 *3-1/8”*	114 *4-1/2”*	48,5 *1-29/32”*	75,4 *2-31/32”*	107,6 *4-15/64”*	37,2 *1-15/32”*	40 *1-9/16”*	15,9 *5/8”*	32 *1-1/4”*	134 *5-9/32”*	6 *15/64”*
L	30	40 *1-19/32”*	46,5 *1-27/32”*	82 *3-7/32”*	47,5 *1-7/8”*	87,6 *3-7/16”*	126,6 *5”*	21 *53/64”*	25 *1”*	10,5 *13/32”*	30 *1-3/16”*	148,5 *5-27/32”*	6 *15/64”*
	31	51 *2”*	56,5 *2-7/32”*	91 *3-37/64”*	47,5 *1-7/8”*	91,6 *3-19/32”*	122,4 *4-13/16”*	25,5 *1”*	25 *1”*	14,6 *9/16”*	30 *1-3/16”*	148,6 *5-27/32”*	6 *15/64”*
	32	60 *2-3/8”*	65,5 *2-37/64”*	100 *3-15/16”*	47,5 *1-7/8”*	94,2 *3-45/64”*	129 *5-5/64”*	30 *1-3/16”*	32 *1-1/4”*	14,6 *9/16”*	32 *1-1/4”*	153 *5-9/32”*	6 *15/64”*
	33	74,5 *2-15/16”*	79,5 *3-1/8”*	114 *4-1/2”*	48,5 *1-29/32”*	94,4 *3-23/32”*	126,6 *5”*	37,2 *1-15/32”*	40 *1-9/16”*	15,9 *5/8”*	32 *1-1/4”*	153 *6”*	6 *15/64”*
LL	31	51 *2”*	56,5 *2-7/32”*	91 *3-37/64”*	47,5 *1-7/8”*	87,6 *3-7/16”*	126,6 *5”*	25,5 *1”*	25 *1”*	10,5 *13/32”*	30 *1-3/16”*	148,6 *5-27/32”*	6 *15/64”*

Note:
dimensions in mm
dimensions in inches





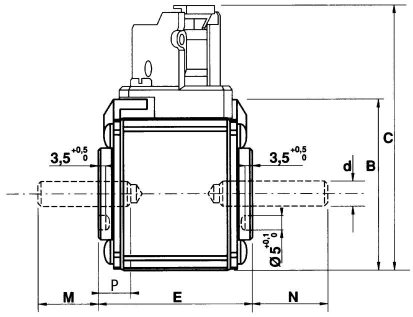
Microswitches supplied separately (see page 420)

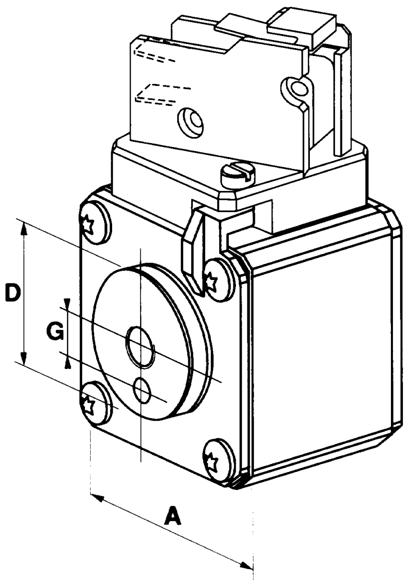
Semiconductor Fuses

American and European Square-body Fuses

French standard PSC 450 to 660VAC End contacts

Size	Catalog Number	Reference Number	Weight (g)	Packaging
	6,6 URD 30 TTF 0063	M300000		
	6,6 URD 30 TTF 0080	S300051		
	6,6 URD 30 TTF 0100	T300052		
	6,6 URD 30 TTF 0125	V300053		
	6,6 URD 30 TTF 0160	W300054		
	6,6 URD 30 TTF 0200	X300055		
30	6,6 URD 30 TTF 0250	Y300056	245	3
	6,6 URD 30 TTF 0315	Z300057		
	6,6 URD 30 TTF 0350	A300058		
	6,6 URD 30 TTF 0400	B300059		
	6,6 URD 30 TTF 0450	V300398		
	6,6 URD 30 TTF 0500	W300399		
	6,6 URD 30 TTF 0550	X300400		
	6,6 URD 31 TTF 0200	N300001		
	6,6 URD 31 TTF 0250	P300002		
	6,6 URD 31 TTF 0315	Q300003		
	6,6 URD 31 TTF 0350	M300046		
31	6,6 URD 31 TTF 0400	R300004	370	3
	6,6 URD 31 TTF 0450	S300005		
	6,6 URD 31 TTF 0500	T300006		
	6,6 URD 31 TTF 0550	V300007		
	6,6 URD 31 TTF 0630	W300008		
	6,6 URD 31 TTF 0800	Y300401		
	6,6 URD 32 TTF 0400	H300065		
	6,6 URD 32 TTF 0450	J300066		
	6,6 URD 32 TTF 0500	K300067		
	6,6 URD 32 TTF 0550	L300068	510	3
	6,6 URD 32 TTF 0630	M300069		
	6,6 URD 32 TTF 0700	N300070		
32	6,6 URD 32 TTF 0800	P300071		
	6,6 URD 32 TTF 0900 **	Q300072		
	6,6 URD 32 TTF 1000 **	S300074		
	6 URD 32 TTF 1100 **	M300759		
	5,5 URD 32 TTF 1250 **	P301060		
	5 URD 32 TTF 1400 **	Q301061	600	3
	5 URD 32 TTF 1600 **	H300893		
	4,5 URD 32 TTF 1800 **	R301062		
	6,6 URD 33 TTF 0500	V300076		
	6,6 URD 33 TTF 0550	W300077		
	6,6 URD 33 TTF 0630	X300078		
	6,6 URD 33 TTF 0700	Y300079	790	3
	6,6 URD 33 TTF 0800	Z300080		
	6,6 URD 33 TTF 0900	A300081		
	6,6 URD 33 TTF 1000	B300082		
33	6,6 URD 33 TTF 1100	C300083		
	6,6 URD 33 TTF 1250 **	D300084		
	6,6 URD 33 TTF 1400 **	E300085		
	6 URD 33 TTF 1500 **	Y300585		
	6 URD 33 TTF 1600 **	Z300586		
	6 URD 33 TTF 1800 **	A300587	910	3
	5,5 URD 33 TTF 2000 **	B300588		
	5 URD 33 TTF 2250 **	K300757		
	4,5 URD 33 TTF 2500 **	L300758		





Threaded studs and microswitches supplied separately (see pages 422 and 420)

Note:
dimensions in mm
inches

Size	A	B	C	D	M±	N±	E±1	d	G±0.1	P±0.1
70	40 1-9/16″	46,5 1-27/32″	82 3-7/32″	26 1-1/64″	22	27	50,6 2″	M8	9 23/64″	6 15/64″
71	51 2″	56,5 2-7/32″	91 3-37/64″	30 1-3/16″	19	24	50,6 2″	M8	9 23/64″	9 23/64″
72	60 2-3/8″	65,5 2-37/64″	100 3-15/16″	38 ; (42mm **) 1-1/2″ ; (1-21/32″ **)	19	39	50,6 2″	M10	15 19/32″	9 23/64″
73	74,5 2-15/16″	79,5 3-1/8″	114 4-1/2″	46 ; (52mm **) 1-13/16″ ; (2-1/16″ **)	24	39	50,6 2″	M12	15 19/32″	9 23/64″

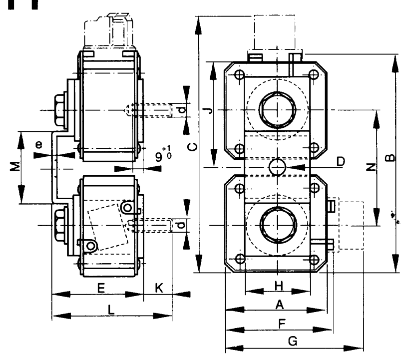
French standard PSC 400 to 660VAC End contacts

Size	Catalog Number	Reference Number	Weight (g)	Packaging
2 x 32	6,6 URD 232 TTF 1000	T300213	1240	1
	6,6 URD 232 TTF 1250	V300214		
	6,6 URD 232 TTF 1400	G300087		
	6,6 URD 232 TDF 1600	W300215	3300	
	6,6 URD 232 TDF 1800	X300216		
	6,6 URD 232 TDF 2000	Y300217		
	5,5 URD 232 TDF 2200	D301993		
2 x 33	6,6 URD 233 TTF 1250	D300268	1900	1
	6,6 URD 233 TTF 1400	E300269		
	6,6 URD 233 TTF 1600	F300270		
	6,6 URD 233 TTF 1600	Y301643	2000	
	6,6 URD 233 PLAF 1800	B300427		
	6 URD 233 PLAF 2000	-		
	6 URD 233 PLAF 2200	-		
	6 URD 233 PLAF 2500	-		
	6 URD 233 PLAF 2800	-		
	5,5 URD 233 PLAF 3000	L301977		
	5,5 URD 233 PLAF 3200	M301978		
	5 URD 233 PLAF 3600	N301979		
	5 URD 233 PLAF 4000	P301980		
	4 URD 233 PLAF 4500	Q301981		
	4 URD 233 PLAF 5000	R301982		

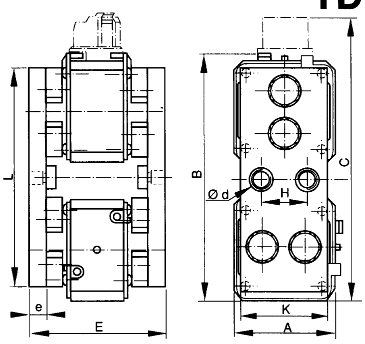
Dimensions in mm

Size	A	B	C	D	E	F	G	H	J	K	d	e	L	M	N
2x32 TT	60	138,5	172	11	67,6	66,5	100	35	61	40	M 10	4	107,5	48	72
2x33 TT	74,5	167	200	13	67,6	81	114	50	80	40	M 12	4	107,5	54	86
2x32 TD	65,5	147	182	-	91,5	-	-	30	-	60	M 10	12	140	-	-
2x33 PLAF	75	171,5	207	-	55,5	-	115	40	-	71	M 10	15	81	-	-

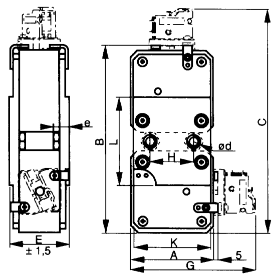
TT



TD



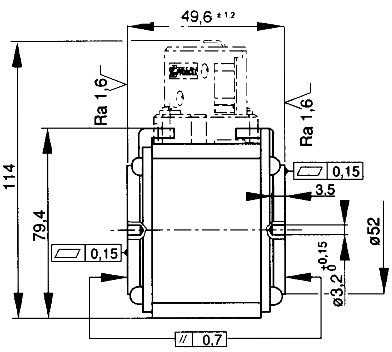
PLAF



Studs and microswitches supplied separately

33 PPAF Standard Press-Pack

Size	Catalog Number	Reference number	Weight (g)	Packaging
33	6,6 URD 33 PPAF 1250	-	910	3
	6,6 URD 33 PPAF 1400	-		



French standard PSC 660VAC Blades

Size	Catalog Number	Reference Number	Weight (g)	Packaging	Base	I/I_N*
30	6,6 URD 30 EF 0063	H300088	290	3	SP30	1
	6,6 URD 30 EF 0080	J300089				1
	6,6 URD 30 EF 0100	K300090				1
	6,6 URD 30 EF 0125	L300091				1
	6,6 URD 30 EF 0160	M300092				0,95
	6,6 URD 30 EF 0200	N300093				0,90
	6,6 URD 30 EF 0250	P300094				0,85
	6,6 URD 30 EF 0315	Q300095				0,80
	6,6 URD 30 EF 0350	R300096				0,80
	6,6 URD 30 EF 0400	S300097				0,75
31	6,6 URD 31 EF 0200	C300037	430	3	SE31	1
	6,6 URD 31 EF 0250	D300038				1
	6,6 URD 31 EF 0315	E300039				0,95
	6,6 URD 31 EF 0350	N300047				0,95
	6,6 URD 31 EF 0400	F300040				0,95
	6,6 URD 31 EF 0450	G300041				0,95
	6,6 URD 31 EF 0500	H300042				0,95
	6,6 URD 31 EF 0550	J300043				0,90
	6,6 URD 31 EF 0630	K300044				0,90
	6,6 URD 31 EF 0700	L300045				0,85
32	6,6 URD 32 EF 0400	V300168	590	3	SE32	0,95
	6,6 URD 32 EF 0450	W300169				0,95
	6,6 URD 32 EF 0500	X300170				0,90
	6,6 URD 32 EF 0550	Y300171				0,90
	6,6 URD 32 EF 0630	Z300172				0,85
	6,6 URD 32 EF 0700	A300173				0,85
	6,6 URD 32 EF 0800	B300174				0,80
	6,6 URD 32 EF 0900	C300175				0,80
	6,6 URD 32 EF 1000	D300176				0,80
33	6,6 URD 33 EF 0500	Z300218	860	3	SF33	0,95
	6,6 URD 33 EF 0550	A300219				0,95
	6,6 URD 33 EF 0630	B300220				0,90
	6,6 URD 33 EF 0700	C300221				0,90
	6,6 URD 33 EF 0800	D300222				0,90
	6,6 URD 33 EF 0900	E300223				0,85
	6,6 URD 33 EF 1000	F300224				0,85
	6,6 URD 33 EF 1100	G300225				0,80
	6,6 URD 33 EF 1250	H300226				0,80
	6,6 URD 33 EF 1400	J300227				0,80

*I/I_N: Ratio "maximum continuous permissible RMS current I_N" for a fuse fitted into the bases.

Connections defined as per IEC 269-1 and for a calm ambience of 30°C.

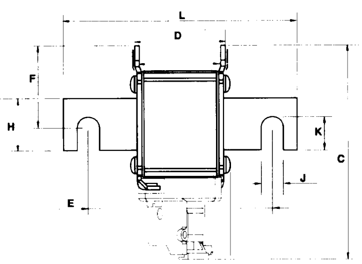
Size	A	B	C	D	$E^{\pm 1,1}$	L	F	H	J	K	e
30	40	62	96	44,6	76,6	100	38	18	9	11	6
31	51	69	103	44,6	86,6	110	39	25	10,5	16	6
32	60	78	112	44,6	91	126	43	32	13	21,2	6
33	74,5	92,5	127	44,6	91	126	57	40	13	19,5	6

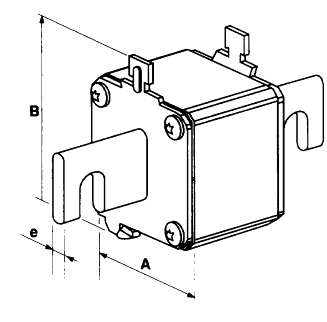
Use the pullout grip PM3 (T097675) for fuse sizes 30, 31, 32.

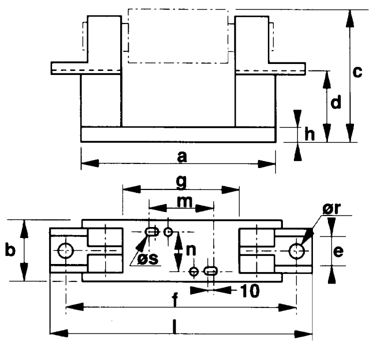
Fuse holders and microswitches supplied separately (see page 420, and Fuse Blocks and Fuse Holders section)

fuse holders	N°ref	a	b	c	d	e	f	g	h	l	m	n	r	s	Weight (g)
SP30	T96939	138	42	92	46	26	135	55	8,5	155	52	28	8,5	5,5	370
SE31	J98701	148	42	103	47	32	159	62	8,5	191	60	28	10,5	5,5	435
SE32	K98702	150	54	114	49	42	180	56	10	216	45	35	12,5	8,5	900
SF33	L98703	136	60	128	46	40	186	56	15	226	25	35	18	9	1600

Dimensions in mm





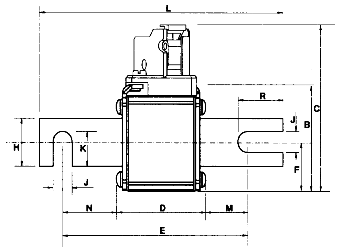


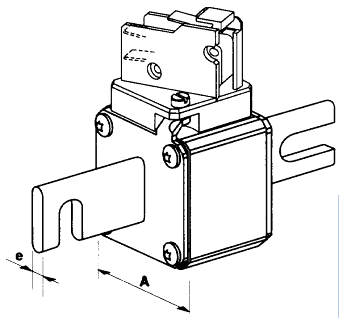
Semiconductor Fuses

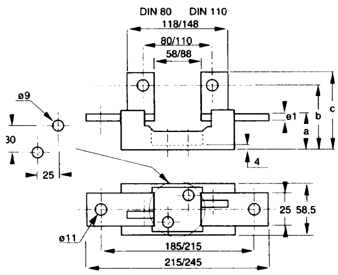
American and European Square-body Fuses

German standard PSC 500 to 660VAC Blades

Size	Catalog Number (1)	Reference number DIN 80	Reference number DIN 110	Weight (g)	Packaging	I/IN Base L98772 F98031	I/IN Base F98560 L91941
30	6,6 URD 30 D.A 0063	E300108	Q300118	290	3	1	1
	6,6 URD 30 D.A 0080	F300109	R300119			1	1
	6,6 URD 30 D.A 0100	G300110	S300120			1	1
	6,6 URD 30 D.A 0125	H300111	T300121			1	1
	6,6 URD 30 D.A 0160	J300112	V300122			1	1
	6,6 URD 30 D.A 0200	K300113	W300123			1	1
	6,6 URD 30 D.A 0250	L300114	X300124			1	1
	6,6 URD 30 D.A 0315	M300115	Y300125			1	1
	6,6 URD 30 D.A 0350	N300116	Z300126			1	1
	6,6 URD 30 D.A 0400	P300117	A300127			1	1
	6,6 URD 30 D.A 0450	A300403	S300695			0,95	1
	6,6 URD 30 D.A 0500	B300404	Y301091			0,95	1
	6,6 URD 30 D.A 0550	C300405	Z301092			0,95	1
31	6,6 URD 31 D.A 0200	Y300010	H300019	430	3	1	1
	6,6 URD 31 D.A 0250	Z300011	J300020			1	1
	6,6 URD 31 D.A 0315	A300012	K300021			1	1
	6,6 URD 31 D.A 0350	Q300049	P300048			1	1
	6,6 URD 31 D.A 0400	B300013	L300022			1	1
	6,6 URD 31 D.A 0450	C300014	M300023			1	1
	6,6 URD 31 D.A 0500	D300015	N300024			1	1
	6,6 URD 31 D.A 0550	E300016	P300025			1	1
	6,6 URD 31 D.A 0630	F300017	Q300026			1	1
	6,6 URD 31 D.A 0700	G300018	R300027			0,95	1
	6,6 URD 31 D.A 0800	D300406	H300709			0,85	0,90
32	6,6 URD 32 D.A 0400	E300177	P300186	590	3	1	1
	6,6 URD 32 D.A 0450	F300178	Q300187			1	1
	6,6 URD 32 D.A 0500	G300179	R300188			1	1
	6,6 URD 32 D.A 0550	H300180	S300189			0,95	1
	6,6 URD 32 D.A 0630	J300181	T300190			0,95	1
	6,6 URD 32 D.A 0700	K300182	V300191			0,90	1
	6,6 URD 32 D.A 0800	L300183	W300192			0,90	0,95
	6,6 URD 32 D.A 0900	M300184	X300193			0,90	0,95
	6,6 URD 32 D.A 1000	N300185	Y300194			0,85	0,95
	6 URD 32 D.A 1100	W302101	-			0,80	0,85
	5 URD 32 D.A 1250	G300409	-			0,80	0,85
33	6,6 URD 33 D.A 0500	G300248	S300258	860	3	0,95	1
	6,6 URD 33 D.A 0550	H300249	T300259			0,90	1
	6,6 URD 33 D.A 0630	J300250	V300260			0,90	0,95
	6,6 URD 33 D.A 0700	K300251	W300261			0,90	0,95
	6,6 URD 33 D.A 0800	L300252	X300262			0,85	0,95
	6,6 URD 33 D.A 0900	M300253	Y300263			0,85	0,95
	6,6 URD 33 D.A 1000	N300254	Z300264			0,80	0,90
	6,6 URD 33 D.A 1100	P300255	A300265			0,80	0,90
	6,6 URD 33 D.A 1250	Q300256	B300266			0,75	0,85
	6,6 URD 33 D.A 1400	R300257	C300267			0,75	0,80
	6 URD 33 D.A 1600	X301803	Z301437			0,70	0,75







Fuse holders and microswitches supplied separately (see page 420, and Fuse Blocks and Fuse Holders section)

Dimensions in mm

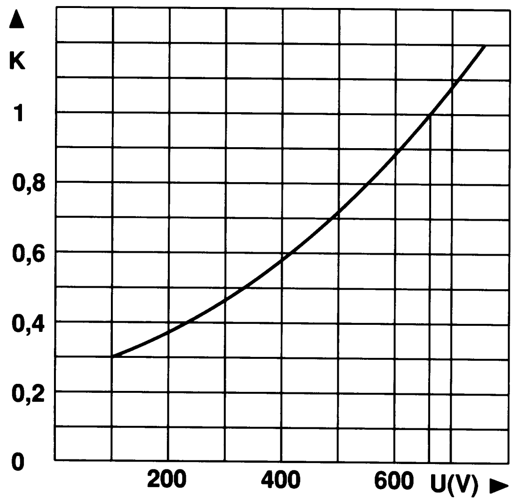
Fuse Size	A	B	C	D	$E^{\pm 1,1}$	F	H	J	K	L	M	N	R	e
30 DIN 80	40	46,5	82	47,5	77	21	25	10,5	17,7	110	11,5	18,5	25,2	6
31 DIN 80	51	56,5	91	47,5	77	25,5	25	10,5	17,7	110	11,5	18,5	25,2	6
32 DIN 80	60	65,5	100	47,5	77	30	32	10,5	21,2	110	11,5	18,5	25,2	6
33 DIN 80	74,5	79,5	114	48,5	77	37,2	40	10,5	25,2	110	11	18	25,2	6
30 DIN 110	40	46,5	82	47,5	101,6	21	25	10,5	17,7	134,6	23,8	30,8	25,2	6
31 DIN 110	51	56,5	91	47,5	101,6	25,5	25	10,5	17,7	134,6	23,8	30,8	25,2	6
32 DIN 110	60	65,5	100	47,5	101,6	30	32	10,5	21,2	134,6	23,8	30,8	25,2	6
33 DIN 110	74,5	79,5	114	48,5	101,6	37,2	40	10,5	25,2	134,6	23,3	30,3	25,2	6

Fuse holders	Ref. Number	a	b	c	e1	x	y	Weight (g)
SI DIN 80 630 A	L97772	40	68	82	5	185	215	660
SI DIN 80 1250 A	F98560	45	73	87	10	185	215	890
SI DIN 110 630 A	F98031	40	68	82	5	215	245	1060
SI DIN 110 1250 A	L91941	45	73	87	10	215	245	1320

Use the pullout grip PM3 (T097675) for fuse sizes 30, 31, 32

(1) Blank to be completed with 08 for DIN80 or 11 for DIN110.

I²t Multiplier coefficient



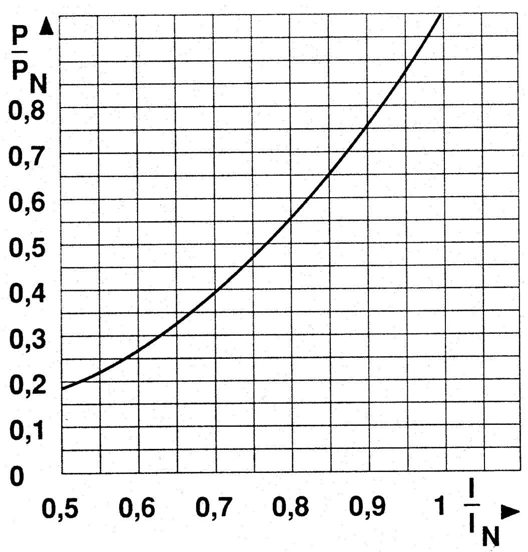
Mean curve indicating variation of total I²t (I²t $_t$) and total operating time T_t in accordance with working voltage U.

Example:
Fuse 350 A in size 30.
I_p = 10 000 A U = 500 V

At 660 V
I²t $_t$ = 80 000 A²s T_t = 6 ms

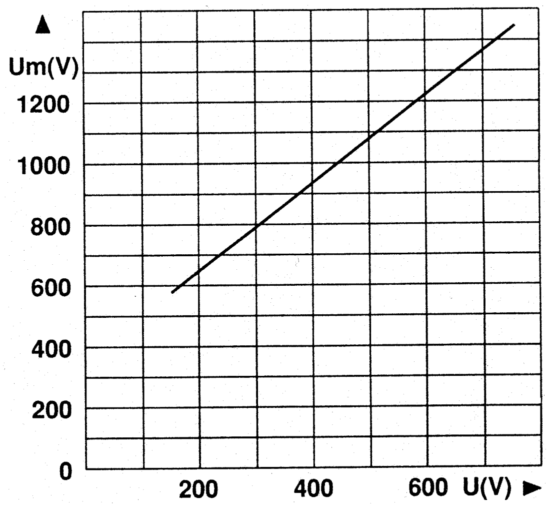
At 500 V
I²t $_t$ = 80 000 x 0.72 = 57 600 A²s
T_t = 6 x 0.72 = 4.3 ms

Dissipated power



Curve enabling calculation of dissipated power P by a fuse rated I_N, as a function of the RMS current I, in multiples of I_N, in a steady state.

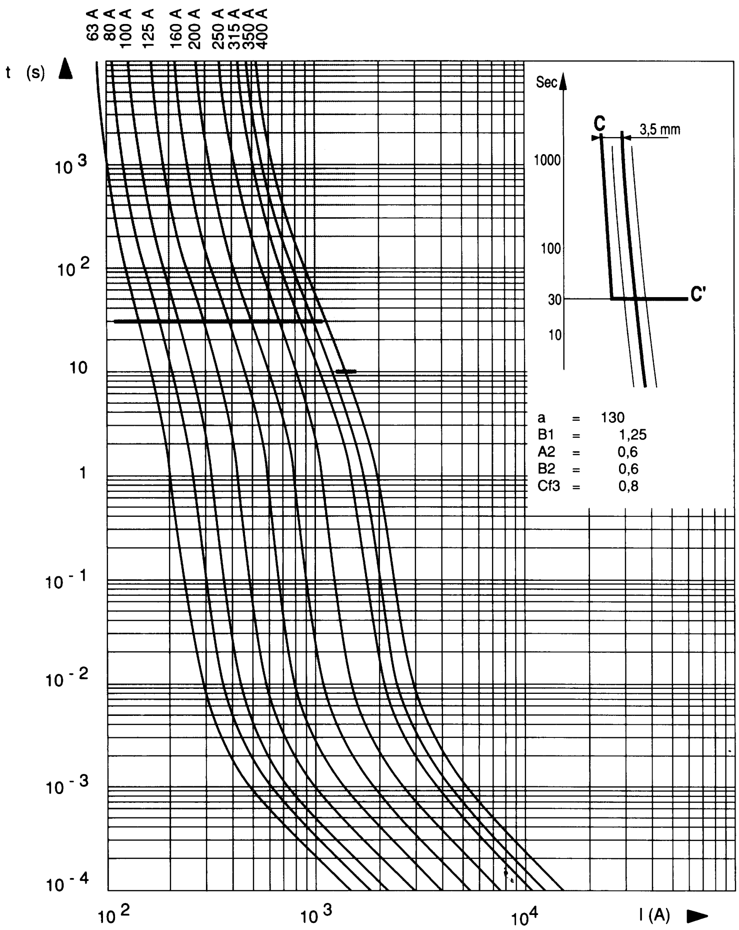
Arc voltage



Curve indicating peak arc voltage Um which may appear across fuse terminals as a function of working voltage U at cos φ = 0.15

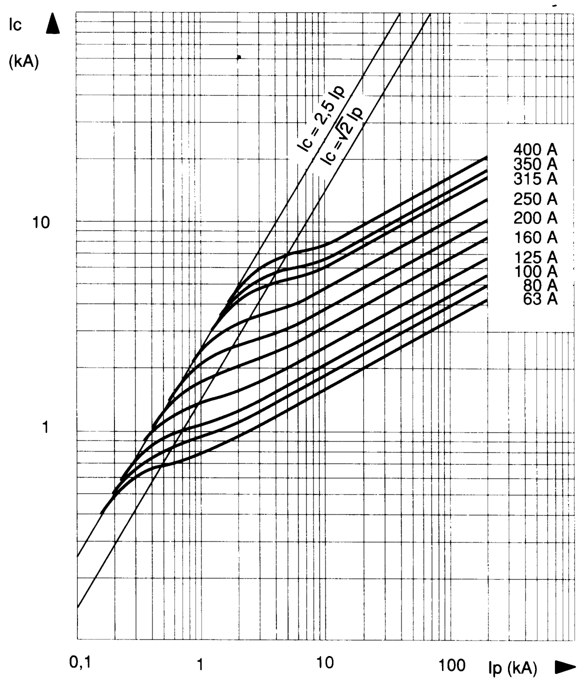
PSC

Size 30



Cut-off characteristics

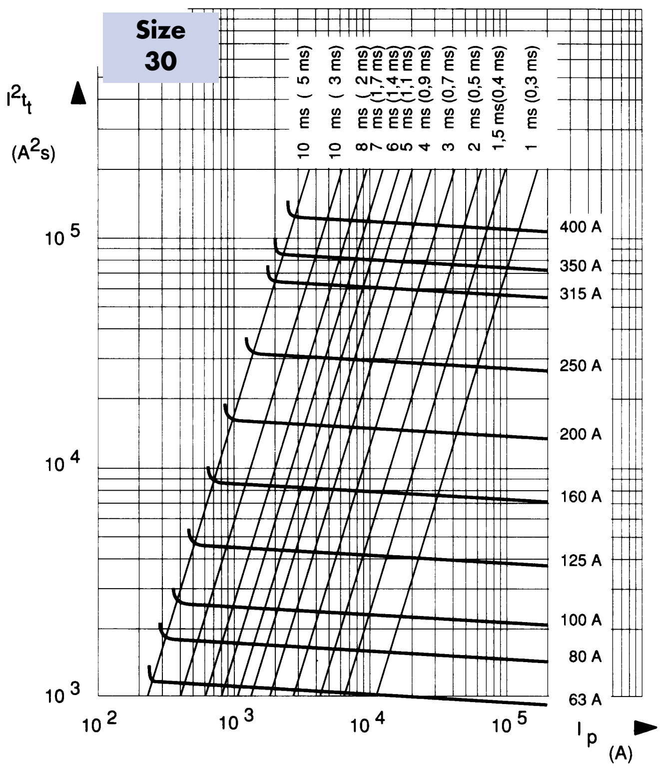
Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.

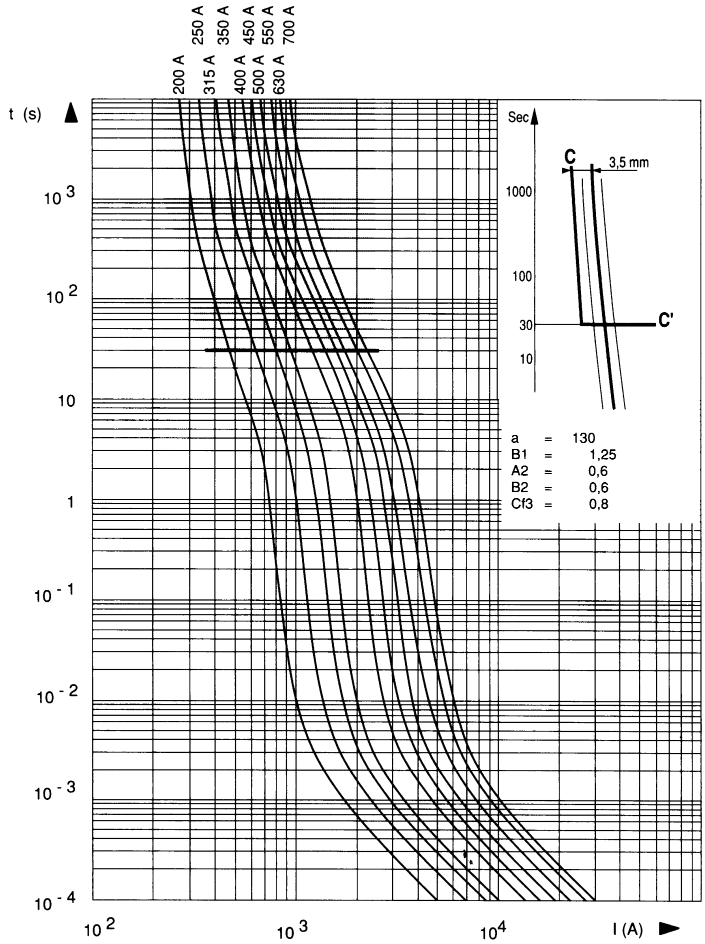
- Tolerances on this current ± 8 %.
- Beyond 30 sec or 10 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



Maximum values of total operating I²t and total operating times

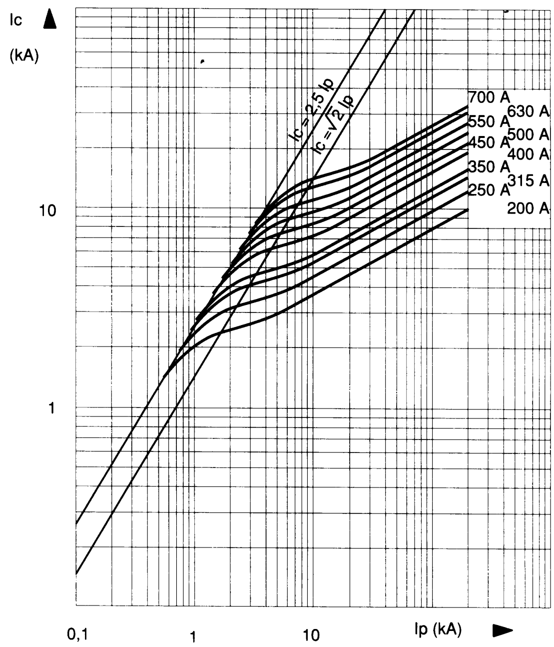
Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 660 V, cos φ = 0.15.

The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.



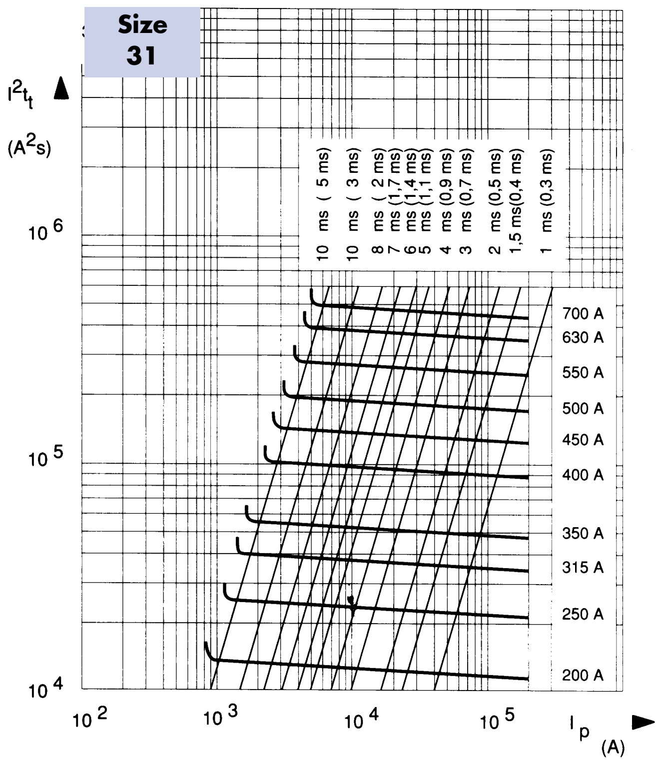
Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.
- Tolerances on this current ± 8 %.
- Beyond 30 sec or 10 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



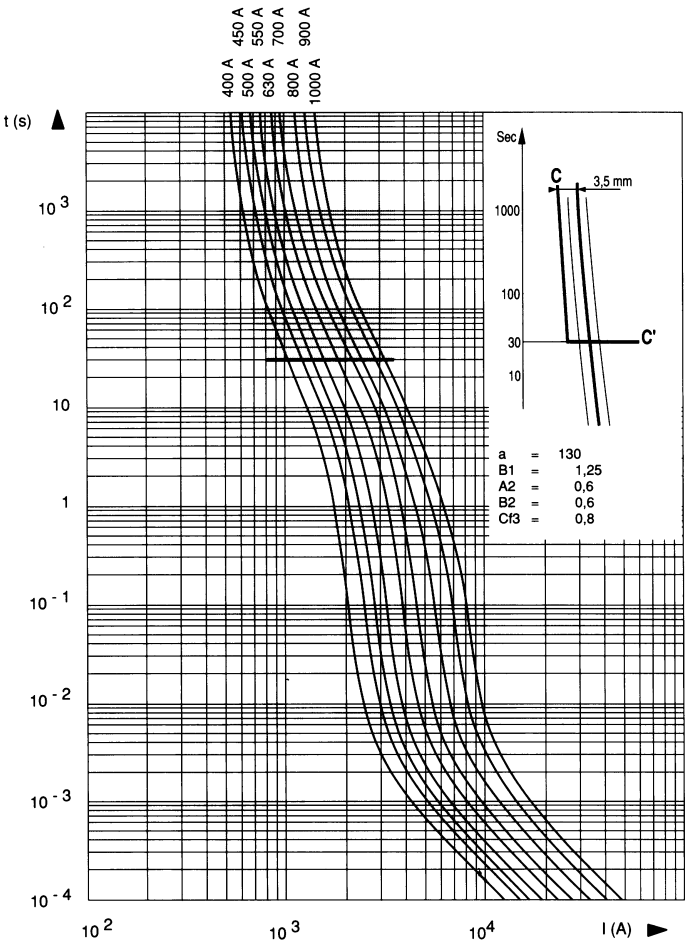
Maximum values of total operating I²t and total operating times

Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 660 V, cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

Semiconductor Fuses

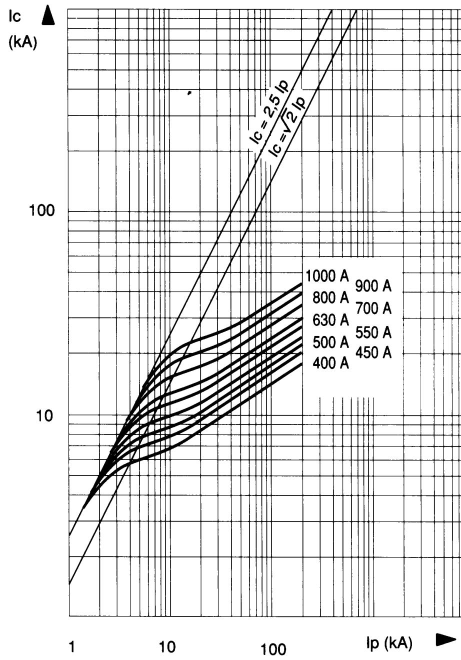
American and European Square-body Fuses

PSC — Size 32



Cut-off characteristics

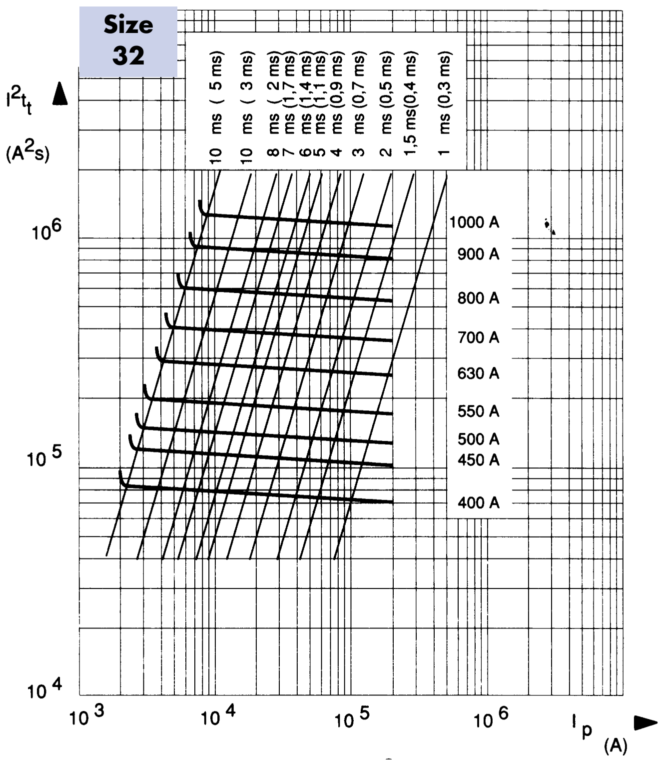
Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.

- Tolerances on this current ± 8 %.
- Beyond 30 sec or 10 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



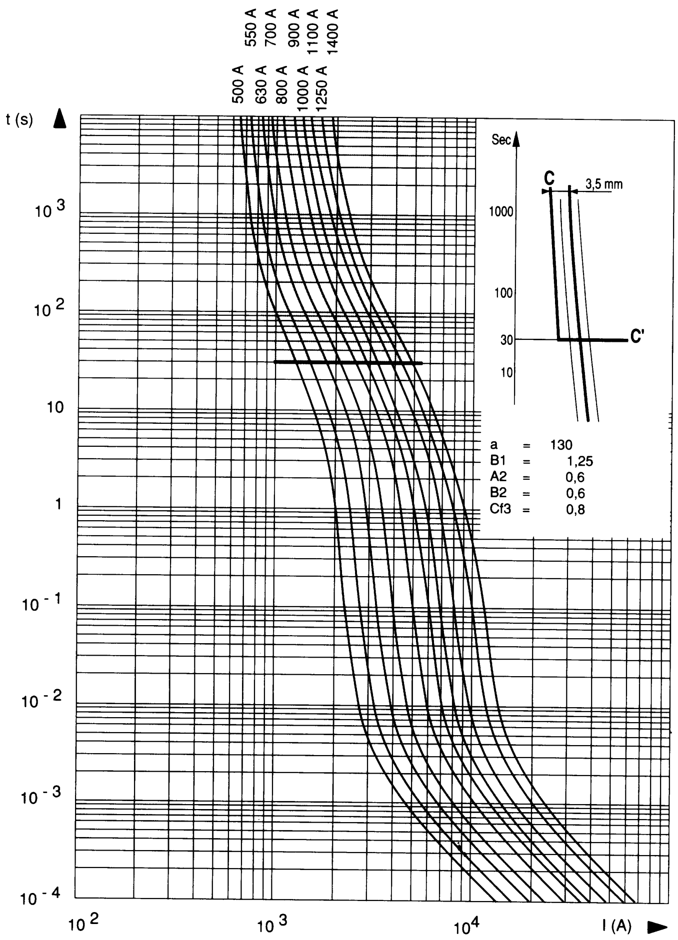
Maximum values of total operating I²t and total operating times

Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 660 V, cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

American and European Square-body Fuses

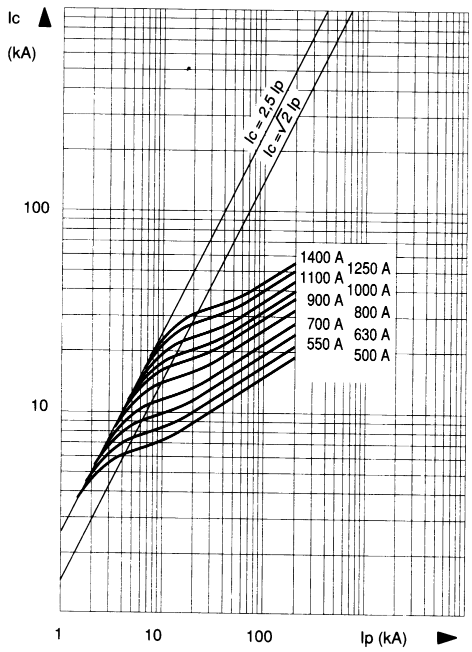
PSC

Size 33



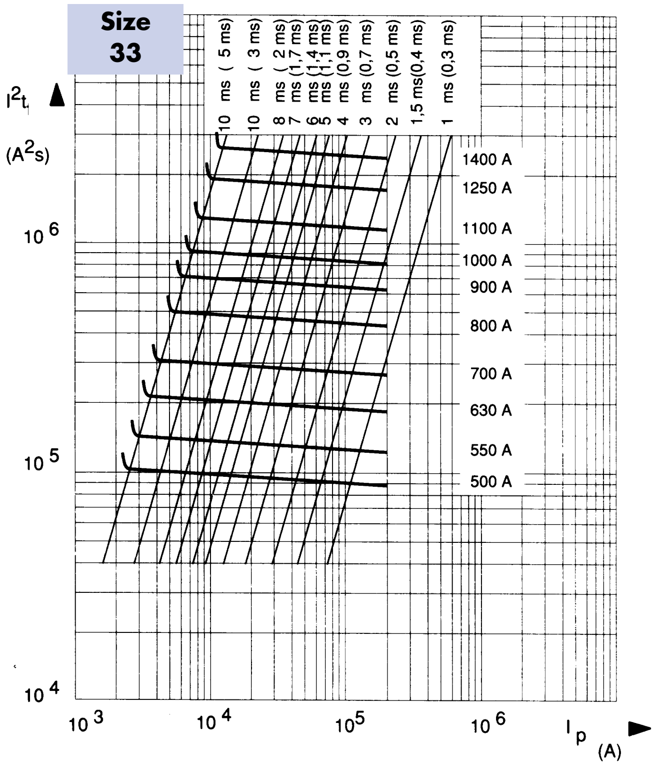
Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.
- Tolerances on this current ± 8 %.
- Beyond 30 sec or 10 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.

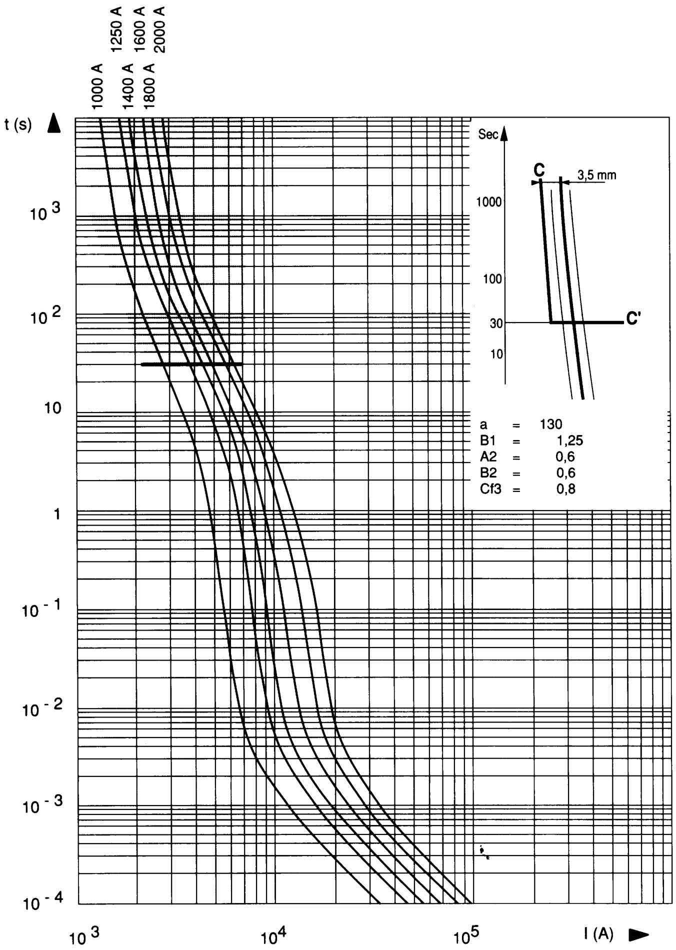


Maximum values of total operating I²t and total operating times

Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 660 V, cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

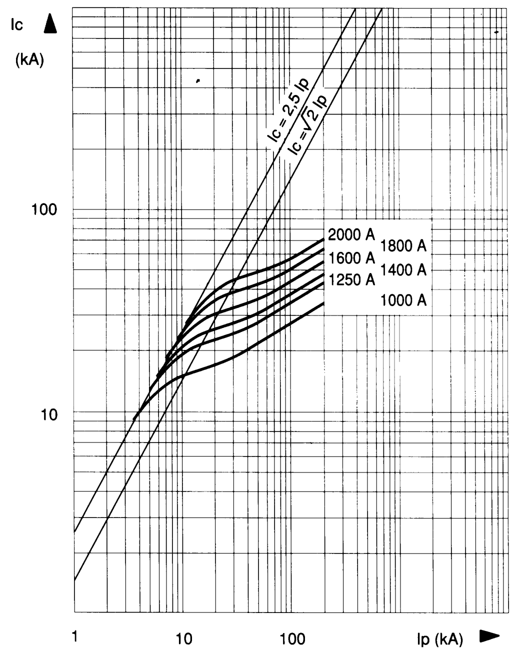
American and European Square-body Fuses

PSC Size 2x32



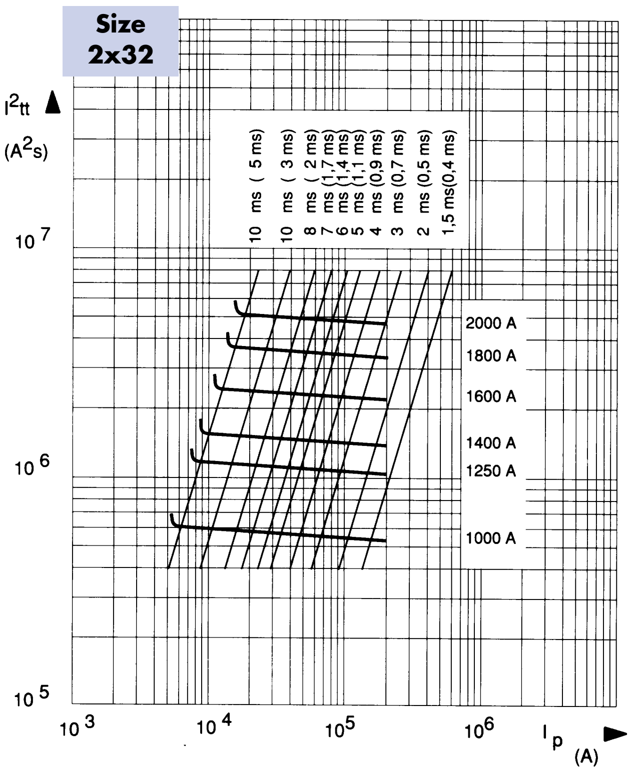
Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

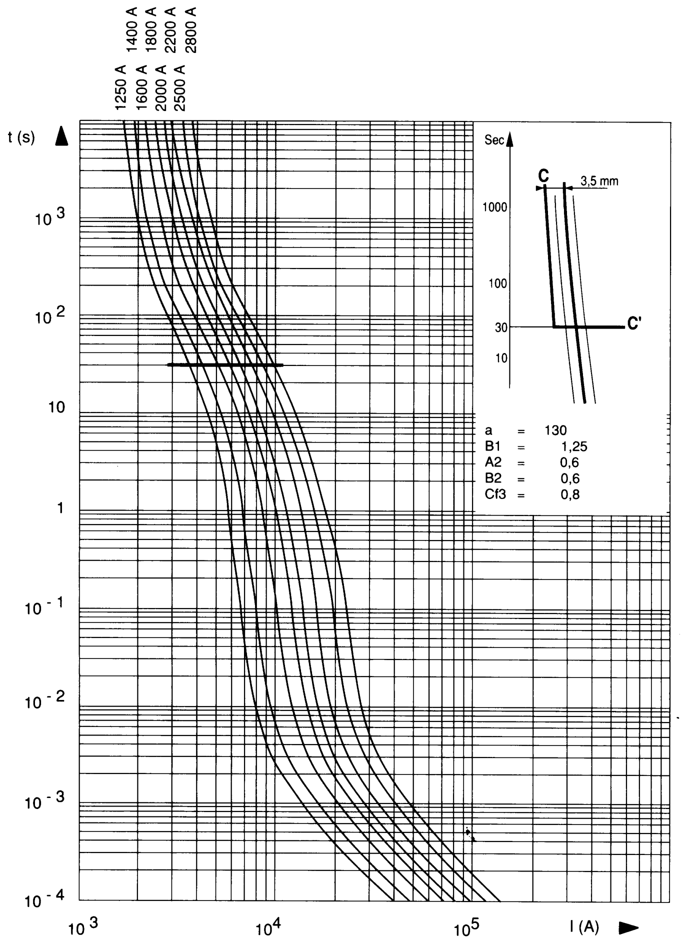
Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.
- Tolerances on this current ± 8 %.
- Beyond 30 sec or 10 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



Maximum values of total operating I²t and total operating times

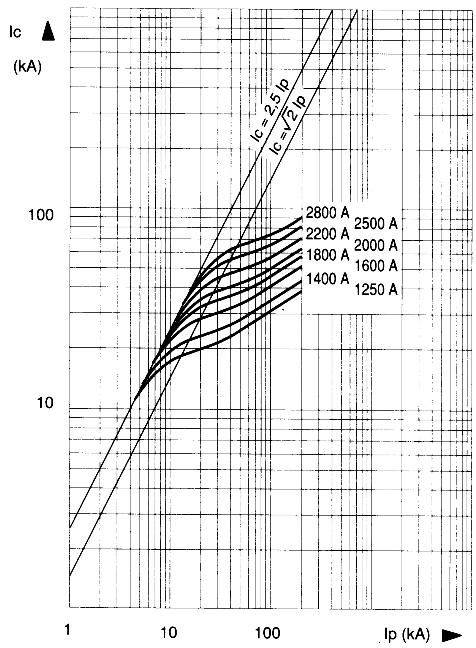
Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 660 V, cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

PSC 2x33



Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.

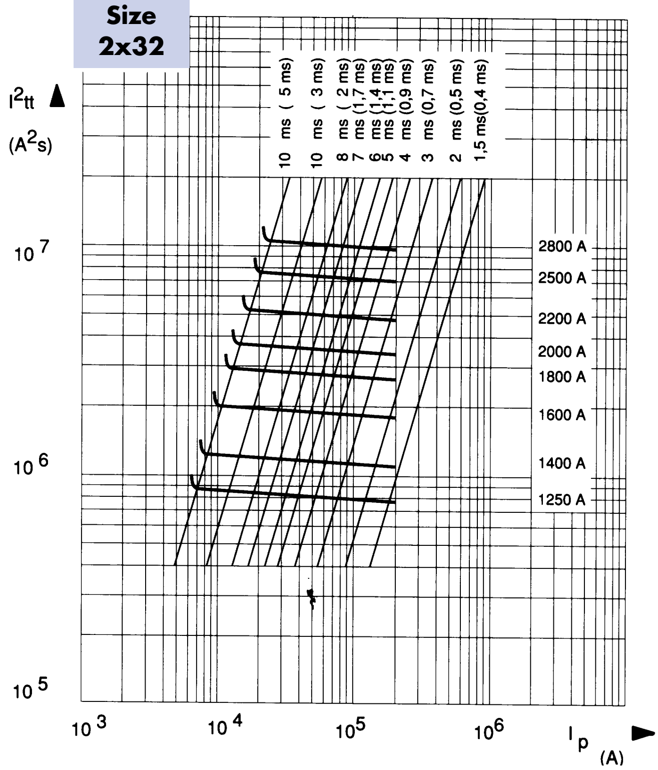


Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.

- Tolerances on this current ± 8 %.
- Beyond 30 sec or 10 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.

Size 2x32



Maximum values of total operating I²t and total operating times

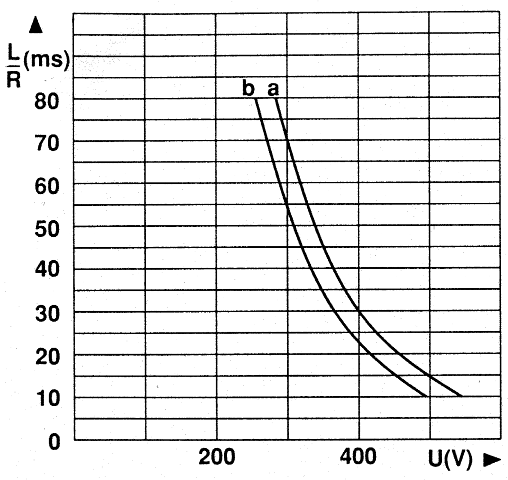
Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 660 V, cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

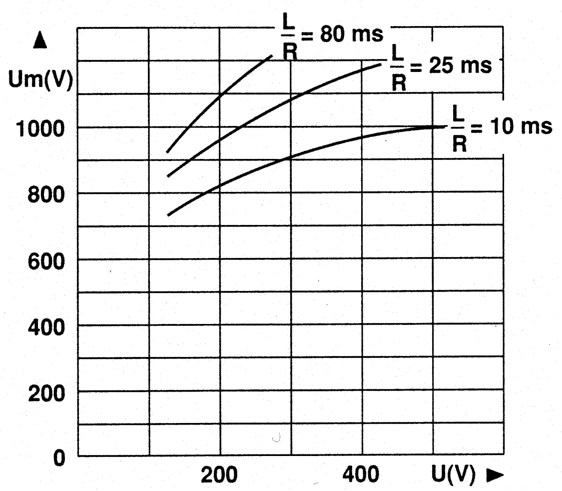
Semiconductor Fuses

American and European Square-body Fuses

PSC 450V to 700VAC fuses, DC performances

DC working voltage possibilities





Rated current I_N (A)	Curves (*) and Ipm (') corresponding to the rating											
	30		31		32		33		2x32		2x33	
	*	Ipm (A)	*	Ipm (A)	*	Ipm (A)	*	Ipm (A)	*	Ipm (A)	*	Ipm (A)
63	a	230										
80	a	300										
100	a	360										
125	a	460										
160	a	650										
200	a	880	a	850								
250	a	1300	a	1150								
315	a	1700	a	1450								
350	a	1900	a	1600								
400	a	2300	a	2200	a	2000						
450			a	2500	a	2300						
500			a	3000	a	2600	a	2300				
550			a	3400	a	3150	a	2500				
630			a	5000	a	3700	a	3250				
700			a	5600	a	4300	a	3900				
800					a	5300	a	4800				
900					a	7800	a	5600				
1000					b	9000	a	6600	a	5200		
1100							a	7700				
1250							b	11000	a	7400	a	6500
1400							b	12500	a	8600	a	7800
1600									a	10600	a	9600
1800									a	15600	a	11200
2000									b	18000	a	13200
2200											a	15400
2500											b	22000
2800											b	25000

Top: Curves indicating the maximum time constant L/R of the fault path as a function of the DC voltage U for the rated currents in the sizes indicated in the table.

Ipm (1) values indicate the minimum breaking current in Amperes (A).

Remark:
When the fault current di/dt is very large, this condition can be exceeded. This is the case for faults occurring in voltage commutated inverters.

Below: Curves indicating peak arc voltage Um which may appear across fuse terminals as a function of the DC working voltage U, for various time constant L/R of fault path.

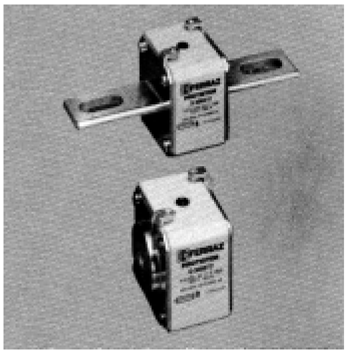
Semiconductor Fuses

American and European Square-body Fuses

PSC — 650 to 1300VAC

650 TO 1300VAC / 63 TO 1800A.
EXCEPTIONALLY LOW I²T, WATT LOSSES.
NON-MAGNETIC CONSTRUCTION,
HIGHLY RELIABLE LOW VOLTAGE
INDICATOR SYSTEM. CONFORMITY TO UL,
CSA INVESTIGATED, IEC, DIN AND VDE STANDARDS.
INCREASED TECHNICAL PERFORMANCE
- HIGHER RATINGS
- REDUCTION IN VOLUME AND WEIGHT.

UL RECOGNIZED



PSC 650 TO 1300VAC US AND EUROPEAN STANDARD

Size	Nominal Voltage U_N (VAC)		Ampere Rating (A)	Pre-arcing I²t at 1 ms I^2t_p (10^3 A^2s)	Total I²t at 1000V I^2t_t (10^3 A^2s)	Power P_N (W)		Tested breaking capacity	
	IEC	USA				End contacts	Blades	IEC	USA
	1250	1300	63	0.21	1.2	26	26		
	1250	1300	80	0.47	2.7	27	27		
	1250	1300	100	0.83	4.8	30	30		
	1250	1300	125	1.3	7.5	38	38	1250 V / 125 kA	1300 V / 125 kA
70	1250	1300	160	2.5	15	45	45		
	1250	1300	200	4.7	27	54	56		
	1250	1300	250	9.6	55	58	61		
	1200	1300	280	14	82	61	64		
	1200	1300	315	20	115	66	72	1200 V / 125 kA	1300 V / 125 kA
	1100	1200	350	28	160	68	75	1100 V / 150 kA	1200 V / 150 kA
	1250	1300	160	2.6	15	46	46		
	1250	1300	200	4.7	27	54	54		
	1250	1300	250	8.9	51	61	61		
	1250	1300	280	12	68	68	70		
	1250	1300	315	16	92	73	76	1250 V / 125 kA	1300 V / 125 kA
	1250	1300	350	22	127	76	80		
71	1250	1300	400	38	220	76	80		
	1250	1300	450	47	270	87	95		
	1100	1200	500	68	390	90	100		
	1100	1200	550	84	485	98	112		
	1100	1200	630	125	725	105	-	1100 V / 150 kA	1200 V / 150 kA
	1000	1100	630	125	725	-	120	1000 V / 150 kA	1100 V / 150 kA
	1250	1300	280	10	60	72	72		
	1250	1300	315	15	87	76	76		
	1250	1300	350	21	120	77	77		
	1250	1300	400	32	190	80	80	1250 V / 125 kA	1300 V / 125 kA
	1250	1300	450	44	255	87	89		
	1250	1300	500	57	330	94	98		
72	1250	1300	550	68	390	110	120		
	1250	1300	630	105	610	113	-		
	1100	1200	630	105	610	-	125	1100 V / 150 kA	1200 V / 150 kA
	1100	1200	700	145	815	122	-		
	1000	1100	700	145	815	-	140	1000 V / 150 kA	1100 V / 150 kA
	1100	1200	800	215	1240	125	-	1100 V / 150 kA	1200 V / 150 kA
	1000	1100	800	215	1240	-	146	1000 V / 150 kA	1100 V / 150 kA
	1250	1300	315	12	68	84	84		
	1250	1300	350	17	100	86	86		
	1250	1300	400	25	145	93	93		
	1250	1300	450	35	205	99	100		
	1250	1300	500	44	255	110	112	1250 V / 125 kA	1300 V / 125 kA
	1250	1300	550	57	330	116	120		
	1250	1300	630	84	485	125	132		
	1250	1300	700	110	640	135	146		
	1200	1300	800	190	640	136	-	1200 V / 125 kA	1300 V / 125 kA
73	1250	1300	800	190	1090	-	148	1100 V / 150 kA	1200 V / 150 kA
	1200	1300	900	250	1090	150	-		
	1000	1100	900	250	1440	-	170	1000 V / 150 kA	1100 V / 150 kA
	1000	1100	1000	370	1440	152	-		
	900	1000	1000	370	2130	-	174		
	900	1000	1100	445	2150	168	208		
	900(²)	1000(²)	1250	585	2900 (¹)	186		900 V / 150 kA	1000 V / 150 kA
	850(²)	950(²)	1400	755	3700 (¹)	210		850 V / 150 kA	900 V / 150 kA
	1250	1300	630	60	348	160			
	1250	1300	700	84	480	162			
	1250	1300	800	130	760	168			
	1250	1300	900	176	1020	183			
2 x 72	1250	1300	1000	228	1320	197		1250 V / 125 kA	1300 V / 125 kA
	1250	1300	1100	272	1560	231			
	1100	1200	1250	420	2440	237			
	1100	1200	1400	580	3260	256			
	1100	1200	1600	860	4960	262		1100 V / 150 kA	1200 V / 150 kA
	1250	1300	800	100	580	195			
	1250	1300	900	142	820	208			
	1250	1300	1000	176	1000	231			
	1250	1300	1100	228	1300	244		1250 V / 125 kA	1300 V / 125 kA
	1250	1300	1250	336	1900	262			
2 x 73	1100	1200	1400	440	2600	283			
	1100	1200	1600	760	4400	286		1100 V / 125 kA	1200 V / 125 kA
	1100	1200	1800	1000	5800	315			
	1000	1100	2000	1480	8500	319		1000 V / 150 kA	1100 V / 150 kA
	950	1000	2200	1780	8600 (¹)	353		950 V / 150 kA	1000 V / 150 kA
	900	950	2500	2340	11500 (¹)	390		900 V / 150 kA	950 V / 150 kA
	850	900	2800	3000	15000 (¹)	440		850 V / 150 kA	950 V / 150 kA

This fuse preselection table indicates, for each size:

- rated current (or rating) I_N
- pre-arcing I²t (I^2t_p) at 1 ms
- total operating I²t (I^2t_t) at 1000 V and 850V(I)f=50Hz, cos φ=0.15, and for a total operating time from 8 to 10 ms
- dissipated power P_N at the rated current I_N, and at 0.8 I_N, in steady state
- breaking capacity at various voltages, checked by tests made in accordance with IEC and American standards.

Estimated breaking capacity: 300 kA

(¹) at 850 V
(²) does not exist with blades

American and European Square-body Fuses

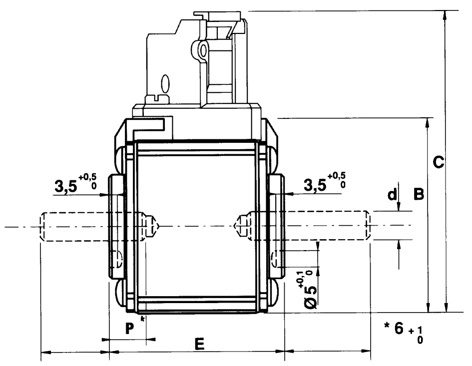
American standard PSC 650 to 1300VAC End contacts

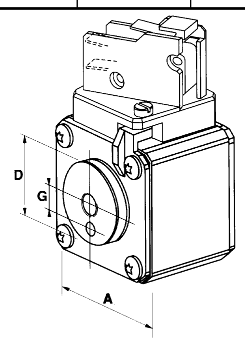
Size	Catalog Number	Reference Number	Weight (g)	Packaging
70	A130URD 70 TTI 0063	Q301015	350	3
	A130URD 70 TTI 0080	R301016		
	A130URD 70 TTI 0100	S301017		
	A130URD 70 TTI 0125	T301018		
	A130URD 70 TTI 0160	V301019		
	A130URD 70 TTI 0200	W301020		
	A130URD 70 TTI 0250	X301021		
	A130URD 70 TTI 0280	Y301022		
	A130URD 70 TTI 0315	Z301023		
	A120URD 70 TTI 0350	A301024		
71	A130URD 71 TTI 0160	B301025	500	3
	A130URD 71 TTI 0200	C301026		
	A130URD 71 TTI 0250	D301027		
	A130URD 71 TTI 0280	E301028		
	A130URD 71 TTI 0315	F301029		
	A130URD 71 TTI 0350	G301030		
	A130URD 71 TTI 0400	H301031		
	A130URD 71 TTI 0450	J301032		
	A130URD 71 TTI 0500	K301033		
	A120URD 71 TTI 0550	L301034		
	A120URD 71 TTI 0630	M301035		
72	A130URD 72 TTI 0280	N301036	760	1-3
	A130URD 72 TTI 0315	P301037		
	A130URD 72 TTI 0350	Q301038		
	A130URD 72 TTI 0400	R301039		
	A130URD 72 TTI 0450	S301040		
	A130URD 72 TTI 0500	T301041		
	A130URD 72 TTI 0550	V301042		
	A130URD 72 TTI 0630	W301043		
	A120URD 72 TTI 0700*	X301044	850	1-3
	A120URD 72 TTI 0800*	Y301045		
73	A130URD 73 TTI 0315	Z301046	1130	1-3
	A130URD 73 TTI 0350	A301047		
	A130URD 73 TTI 0400	B301048		
	A130URD 73 TTI 0450	C301049		
	A130URD 73 TTI 0500	D301050		
	A130URD 73 TTI 0550	E301051		
	A130URD 73 TTI 0630	F301052		
	A130URD 73 TTI 0700	G301053		
	A130URD 73 TTI 0800	H301054		
	A130URD 73 TTI 0900 **	J301055	1250	1-3
	A110URD 73 TTI 1000 **	K301056		
	A100URD 73 TTI 1100 **	L301057		
	A100URD 73 TTI 1250 **	M301058		
	A090URD 73 TTI 1400 **	N301059		
	A070URD 73 TTI 1600 **	Q300877		
	A065URD 73 TTI 1800 **	R300878		

Size	A	B	C	D	E$^{\pm1}$	d	G$^{\pm0.1}$	P$^{\pm0.1}$
70	40 1-9/16"	46,5 1-27/32"	82 3-7/32"	26 1-1/64"	74 2-29/32"	5-16/18"	9 23/64"	6 15/64"
71	51 2"	56,5 2-7/32"	91 3-37/64"	30 1-3/16"	74 2-29/32"	5-16/18"	9 23/64"	9 23/64"
72	60 2-3/8"	65,5 2-37/64"	100 3-15/16"	38 ; (42mm **) 1-1/2" ; (1-21/32" **)	74 2-29/32"	3-8/16"	15 19/32"	9 23/64"
73	74,5 2-15/16"	79,5 3-1/8"	114 4-1/2"	46 ; (52mm **) 1-13/16" ; (2-1/16" **)	74 2-29/32"	1-2/13"	15 19/32"	9 23/64"

Note:
Dimensions in mm
Dimension in inches

Microswitches and threaded studs supplied separately (see pages 420 and 422)

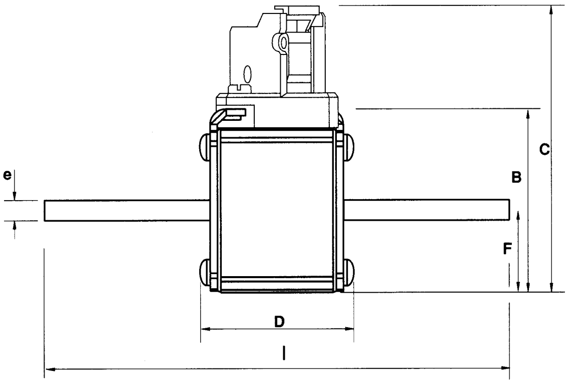


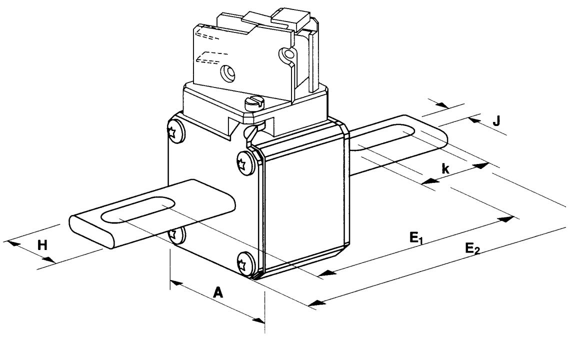


Ferraz Shawmut

American standard PSC 1000 to 1300VAC Blades

Size	Catalog Number	Reference Number	Weight (g)	Packaging
70	A 130 URD 70 LI 0063	W300652	380	3
	A 130 URD 70 LI 0080	X300653		
	A 130 URD 70 LI 0100	Y300654		
	A 130 URD 70 LI 0125	Z300655		
	A 130 URD 70 LI 0160	A300656		
	A 130 URD 70 LI 0200	B300657		
	A 130 URD 70 LI 0250	C300658		
	A 130 URD 70 LI 0280	Q300716		
	A 130 URD 70 LI 0315	D300659		
	A 120 URD 70 LI 0350	E300660		
71	A 130 URD 71 LLI 0160	E300752	630	3
	A 130 URD 71 LLI 0200	F300661		
	A 130 URD 71 LLI 0250	G300662		
	A 130 URD 71 LLI 0280	R300717		
	A 130 URD 71 LLI 0315	H300663		
	A 130 URD 71 LLI 0350	J300664		
	A 130 URD 71 LLI 0400	K300665		
	A 130 URD 71 LLI 0450	L300666		
	A 130 URD 71 LLI 0500	M300667		
	A 130 URD 71 LLI 0550	N300668		
	A 130 URD 71 LLI 0630	P300669		
72	A 130 URD 72 LI 0280	Q300670	860	3
	A 130 URD 72 LI 0315	R300671		
	A 130 URD 72 LI 0350	S300672		
	A 130 URD 72 LI 0400	T300673		
	A 130 URD 72 LI 0450	V300674		
	A 130 URD 72 LI 0500	W300675		
	A 130 URD 72 LI 0550	X300676		
	A 120 URD 72 LI 0630	Y300677		
	A 110 URD 72 LI 0700	Z300678		
	A 110 URD 72 LI 0800	A300679		
73	A 130 URD 73 LI 0315	B300680	1250	1-3
	A 130 URD 73 LI 0350	C300681		
	A 130 URD 73 LI 0400	D300682		
	A 130 URD 73 LI 0450	E300683		
	A 130 URD 73 LI 0500	F300684		
	A 130 URD 73 LI 0550	G300685		
	A 130 URD 73 LI 0630	H300686		
	A 130 URD 73 LI 0700	J300687		
	A 120 URD 73 LI 0800	K300688	900	1-3
	A 110 URD 73 LI 0900	L300689		
	A 100 URD 73 LI 1000	M300690		
	A 100 URD 73 LI 1100	N300691		





Rated voltage 1000 V to 1300 V as per American standard.

Microswitches supplied separately (see page 420)

	A	B	C	D	$E_1^{\pm1,3}$	$E_2^{\pm1,3}$	F	H	J	k	$I^{\pm1,5}$	e
70	40 1-9/16"	46,5 1-27/32"	82 3-7/32"	71 2-5/32"	91,4 3-13/32"	130,4 5-1/8"	21 53/64"	25 1"	10,5 13/32"	30 1-3/16"	152,4 6"	6 15/64"
71	51 2"	56,5 2-7/32"	91 3-37/64"	71 2-25/32"	91,4 3-19/32"	130,4 5-1/8"	25,5 1"	25 1"	10,5 13/32"	30 1-3/16"	152,4 6"	6 15/64"
72	60 2-23/64"	65,5 2-37/64"	100 3-15/16"	71 2-25/32"	97,6 3-23/32"	132,4 5-13/64	30 1-3/16"	32 1-1/4"	14,6 9/16"	32 1-1/4"	157,4 6-3/16"	6 15/64"
73	74,5 2-15/16"	79,5 3-1/8"	114 4-1/2"	72 2-53/64" (2-15/16")	98,8 3-57/64"	131,4 5-11/64"	37,2 1-15/32"	40 1-9/16"	15,9 5/8"	32 1-1/4"	157,4 6-3/16"	6 15/64"

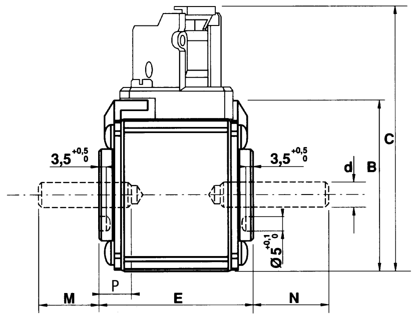
Note:
Dimensions in mm
Dimensions in inches

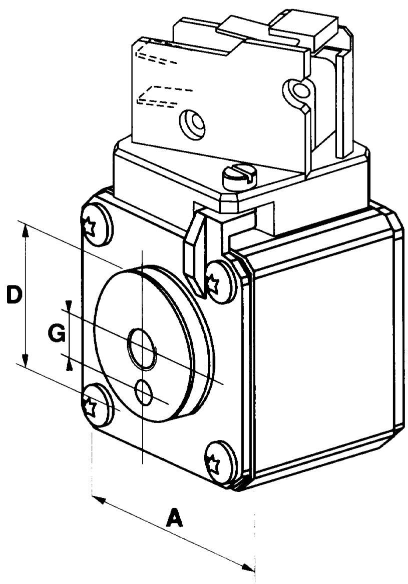
Semiconductor Fuses

American and European Square-body Fuses

French standard PSC 600 to 1250VAC End contacts

Size	Catalog Number	Reference Number	Weight (g)	Packaging
70	12,5 URD 70 TT F 0063	M300483	350	3
	12,5 URD 70 TT F 0080	N300484		
	12,5 URD 70 TT F 0100	P300485		
	12,5 URD 70 TT F 0125	Q300486		
	12,5 URD 70 TT F 0160	R300487		
	12,5 URD 70 TT F 0200	S300488		
	12,5 URD 70 TT F 0250	T300489		
	12 URD 70 TT F 0280	N300714		
	12 URD 70 TT F 0315	V300490		
	11 URD 70 TT F 0350	W300491		
71	12,5 URD 71 TT F 0160	B300749	500	3
	12,5 URD 71 TT F 0200	Z300517		
	12,5 URD 71 TT F 0250	A300518		
	12,5 URD 71 TT F 0280	P300715		
	12,5 URD 71 TT F 0315	B300519		
	12,5 URD 71 TT F 0350	C300520		
	12,5 URD 71 TT F 0400	D300521		
	12,5 URD 71 TT F 0450	E300522		
	11 URD 71 TT F 0500	F300523		
	11 URD 71 TT F 0550	G300524		
	11 URD 71 TT F 0630	H300525		
72	12,5 URD 72 TT F 0280	Y300493	760	1-3
	12,5 URD 72 TT F 0315	Z300494		
	12,5 URD 72 TT F 0350	A300495		
	12,5 URD 72 TT F 0400	B300496		
	12,5 URD 72 TT F 0450	C300497		
	12,5 URD 72 TT F 0500	D300498		
	12,5 URD 72 TT F 0550	E300499		
	12,5 URD 72 TT F 0630	F300500		
	11 URD 72 TT F 0700 **	G300501	850	1-3
	11 URD 72 TT F 0800 **	H300502		
73	12,5 URD 73 TT F 0315	J300503	1130	1-3
	12,5 URD 73 TT F 0350	K300504		
	12,5 URD 73 TT F 0400	L300505		
	12,5 URD 73 TT F 0450	M300506		
	12,5 URD 73 TT F 0500	N300507		
	12,5 URD 73 TT F 0550	P300508		
	12,5 URD 73 TT F 0630	Q300509		
	12,5 URD 73 TT F 0700	R300510		
	12,5 URD 73 TT F 0800	S300511		
	12 URD 73 TT F 0900 **	T300512	1250	1-3
	10 URD 73 TT F 1000 **	V300513		
	9,5 URD 73 TT F 1100 **	W300514		
	9 URD 73 TT F 1250 **	T300696		
	8,5 URD 73 TT F 1400 **	S300718		
	6,6 URD 73 TT F 1600 **	B301301		
	6 URD 73 TT F 1800 **	C301302		





Microswitches and threaded studs supplied separately (see pages 420 and 422)

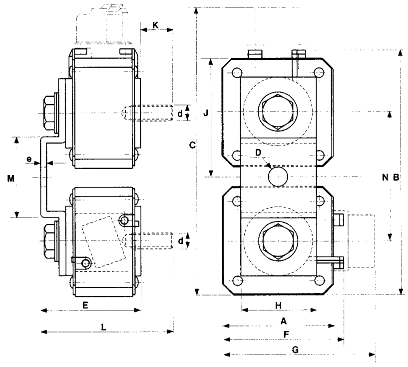
Size	A	B	C	D	M±	N±	E±1	d	G±0.1	P±0.1
70	40 1-9/16"	46,5 1-27/32"	82 3-7/32"	26 1-1/64"	22	27	74 2-29/32"	M8	9 23/64"	6 15/64"
71	51 2"	56,5 2-7/32"	91 3-37/64"	30 1-3/16"	19	24	74 2-29/32"	M8	9 23/64"	9 23/64"
72	60 2-3/8"	65,5 2-37/64"	100 3-15/16"	38 ; (42mm **) 1-1/2" ; (1-21/32" **)	19	39	74 2-29/32"	M10	15 19/32"	9 23/64"
73	74,5 2-15/16"	79,5 3-1/8"	114 4-1/2"	46 ; (52mm **) 1-13/16" ; (2-1/16" **)	24	39	74 2-29/32"	M12	15 19/32"	9 23/64"

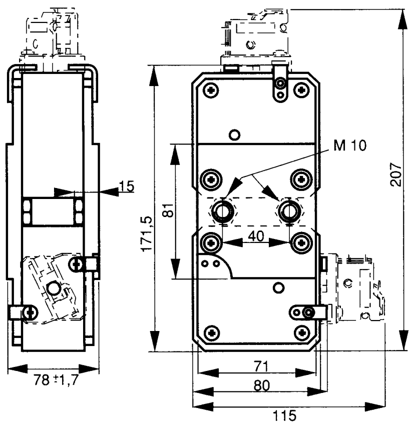
Note:
Dimensions in mm
Dimensions in inches

American and European Square-body Fuses

French standard PSC 550 to 1200VAC End contacts

Size	Catalog Number	Reference Number	Weight (g)	Packaging
73	12,5 URD 73 PPAF 0315	H300640	1250	1-3
	12,5 URD 73 PPAF 0350	J300641		
	12,5 URD 73 PPAF 0400	K300642		
	12,5 URD 73 PPAF 0450	L300643		
	12,5 URD 73 PPAF 0500	M300644		
	12,5 URD 73 PPAF 0550	N300645		
	12,5 URD 73 PPAF 0630	P300646		
	12,5 URD 73 PPAF 0700	Q300647		
	12,5 URD 73 PPAF 0800	R300648		
	12 URD 73 PPAF 0900	S300649		
	10 URD 73 PPAF 1000	T300650		
	9,5 URD 73 PPAF 1100	V300651		
	9 URD 73 PPAF 1250	T300719		
	8,5 URD 73 PPAF 1400	V300720		
2 x 72	12,5 URD 272 TTF 0630	W300721	1750	1
	12,5 URD 272 TTF 0700	X300722		
	12,5 URD 272 TTF 0800	Y300723		
	12,5 URD 272 TTF 0900	Z300724		
	12,5 URD 272 TTF 1000	A300725		
	12,5 URD 272 TTF 1100	B300726		
	11 URD 272 TTF 1250	-		
	11 URD 272 TTF 1400	D300728	1900	
	10 URD 272 TTF 1600	-		
	9 URD 272 TTF 1800	E301994		
	7,5 URD 272 TTF 2000	F301995		
	6,5 URD 272 TTF 2200	G301996		
	6,5 URD 272 TTF 2500	H301997		
2 x 73	12,5 URD 273 TTF 0800	F300730	2600	1
	12,5 URD 273 TTF 0900	G300731		
	12,5 URD 273 TTF 1000	H300732		
	12,5 URD 273 TTF 1100	J300733		
	12,5 URD 273 TTF 1250	K300734		
	11 URD 273 TTF 1400	-		
	11 URD 273 TTF 1600	-		
	11 URD 273 TTF 1800	-		
	10 URD 273 TTF 2000	P300738	2800	
	9,5 URD 273 TTF 2200	Q300739		
	9,5 URD 273 PLAF 2200	M301909	2700	
	9 URD 273 PLAF 2500	R300740		
	8,5 URD 273 PLAF 2800	S300741		
	6 URD 273 PLAF 3000	K301999		
	6 URD 273 PLAF 3200	M302001		
	5,5 URD 273 PLAF 3600	N302002		





Microswitches and threaded studs supplied separately (see pages 420 and 422)

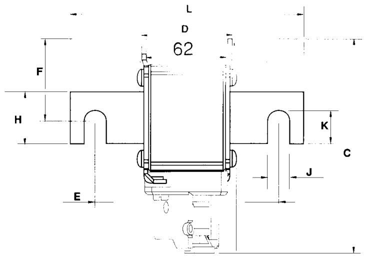
	A	B	C	D	E	F	G	H	J	K	d	e	L	M	N
2 x 72 TTF	60	138,5	172	11	91	65,5	100	35	66	39	M 10	4	131	48	72
2 x 73 TTF	74,5	167	200	13	91	79,5	114	50	80	39	M 12	4	131	54	86

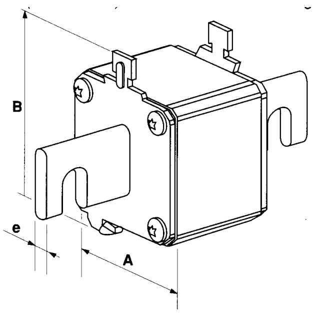
Dimensions in mm

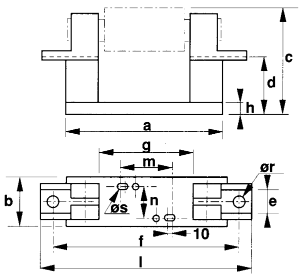
American and European Square-body Fuses

French standard PSC 900 to 1250VAC Blades

Size	Catalog Number	Reference Number	Weight (g)	Packaging	Base	I/I_N*
70	12,5 URD 70 E F 0063	P300600	380	3	SP 70	1
	12,5 URD 70 E F 0080	Q300601				1
	12,5 URD 70 E F 0100	R300602				1
	12,5 URD 70 E F 0125	S300603				0,95
	12,5 URD 70 E F 0160	T300604				0,90
	12,5 URD 70 E F 0200	V300605				0,85
	12,5 URD 70 E F 0250	W300606				0,80
	12 URD 70 E F 0280	L300712				0,80
	12 URD 70 E F 0315	X300607				0,75
	11 URD 70 E F 0350	Y300608				0,75
71	12,5 URD 71 E F 0160	C300750	570	3	SE 71	1
	12,5 URD 71 E F 0200	Z300609				1
	12,5 URD 71 E F 0250	A300610				1
	12,5 URD 71 E F 0280	M300713				0,95
	12,5 URD 71 E F 0315	B300611				0,95
	12,5 URD 71 E F 0350	C300612				0,90
	12,5 URD 71 E F 0400	D300613				0,90
	12,5 URD 71 E F 0450	E300614				0,85
	11 URD 71 E F 0500	F300615				0,85
	11 URD 71 E F 0550	G300616				0,80
	10 URD 71 E F 0630	H300617				0,80
72	12,5 URD 72 E F 0280	J300618	800	3	SE 72	1
	12,5 URD 72 E F 0315	K300619				1
	12,5 URD 72 E F 0350	L300620				1
	12,5 URD 72 E F 0400	M300621				1
	12,5 URD 72 E F 0450	N300622				0,95
	12,5 URD 72 E F 0500	P300623				0,90
	12,5 URD 72 E F 0550	Q300624				0,85
	11 URD 72 E F 0630	R300625				0,85
	10 URD 72 E F 0700	S300626				0,80
	10 URD 72 E F 0800	T300627				0,80
73	12,5 URD 73 E F 0315	V300628	1150	3	SF73	1
	12,5 URD 73 E F 0350	W300629				1
	12,5 URD 73 E F 0400	X300630				1
	12,5 URD 73 E F 0450	Y300631				1
	12,5 URD 73 E F 0500	Z300632				1
	12,5 URD 73 E F 0550	A300633				0,95
	12,5 URD 73 E F 0630	B300634				0,95
	12 URD 73 E F 0700	C300635				0,90
	11 URD 73 E F 0800	D300636				0,90
	10 URD 73 E F 0900	E300637				0,85
	9 URD 73 E F 1000	F300638				0,85
	9 URD 73 E F 1100	G300639				0,80







Pull out grip PM7 (V097676) in size 70-71-72

* I/I_N : Ratio "maximum continuous permissible RMS current I_N" for a fuse fitted into the bases. Connections defined as per IEC 269-1 and for a calm ambience of 30°C.

Fuse holders and microswitches supplied separately (see page 420 and Fuse Blocks and Fuse Holders section)

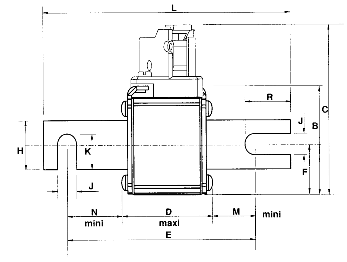
Dimensions in mm

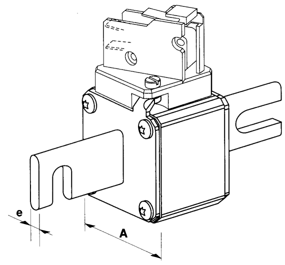
	A	B	C	D	$E^{\pm1,3}$	$L^{\pm1,3}$	F	H	J	k	e
70	40	62	96	67	100	123,4	38	18	9	11	6
71	51	69	103	68	110	133,4	39	25	10,5	16	6
72	60	78	112	68	114,4	149,4	43	32	13	21,2	6
73	74,5	92,5	127	68	114,4	149,4	57	40	13	19,5	6

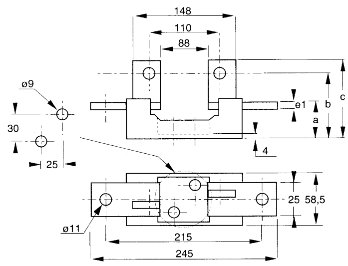
Fuse holders	Ref. N°	a	b	c	d	e	f	g	h	l	m	n	r	s	Weight (g)
SP 70	F096099	148	42	92	47,5	26	168	88	10	188	60	28	8,5	5,5	400
SE 51-71	V098711	148	42	103	47	32	182	85	8,5	214	60	28	10,5	5,5	470
SE 52-72	W098712	150	54	114	49	42	204	80	10	240	45	35	12,5	8,5	940
SF 53-73	X098713	160	60	128	41	40	210	80	10	250	40	35	18	9	1700

German standard PSC 900 to 1250VAC Blades

Size	Catalog Number	Reference Number	Weight (g)	Packaging	* I/In Base	
					F098031	F098031
70	12,5 URD 70 D 11 A 0063	V300536	380	3	1	1
	12,5 URD 70 D 11 A 0080	W300537			1	1
	12,5 URD 70 D 11 A 0100	X300538			1	1
	12,5 URD 70 D 11 A 0125	Y300539			1	1
	12,5 URD 70 D 11 A 0160	Z300540			1	1
	12,5 URD 70 D 11 A 0200	A300541			1	1
	12,5 URD 70 D 11 A 0250	B300542			1	1
	12 URD 70 D 11 A 0280	J300710			1	1
	12 URD 70 D 11 A 0315	C300543			1	1
	11 URD 70 D 11 A 0350	D300544			1	1
71	12,5 URD 71 D 11 A 0160	D300751	570	3	1	1
	12,5 URD 71 D 11 A 0200	E300545			1	1
	12,5 URD 71 D 11 A 0250	F300546			1	1
	12,5 URD 71 D 11 A 0280	K300711			1	1
	12,5 URD 71 D 11 A 0315	G300547			1	1
	12,5 URD 71 D 11 A 0350	H300548			1	1
	12,5 URD 71 D 11 A 0400	J300549			1	1
	12,5 URD 71 D 11 A 0450	K300550			0,95	1
	11 URD 71 D 11 A 0500	L300551			0,95	1
	11 URD 71 D 11 A 0550	M300552			0,90	1
	10 URD 71 D 11 A 0630	N300553			0,90	0,95
72	12,5 URD 72 D 11 A 0280	P300554	800	3	1	1
	12,5 URD 72 D 11 A 0315	Q300555			1	1
	12,5 URD 72 D 11 A 0350	R300556			1	1
	12,5 URD 72 D 11 A 0400	S300557			1	1
	12,5 URD 72 D 11 A 0450	T300558			1	1
	12,5 URD 72 D 11 A 0500	V300559			0,95	1
	12,5 URD 72 D 11 A 0550	W300560			0,90	0,95
	11 URD 72 D 11 A 0630	X300561			0,90	0,95
	10 URD 72 D 11 A 0700	Y300562			0,85	0,90
	10 URD 72 D 11 A 0800	Z300563			0,85	0,90
73	12,5 URD 73 D 11 A 0315	A300564	1150	3	1	1
	12,5 URD 73 D 11 A 0350	B300565			1	1
	12,5 URD 73 D 11 A 0400	C300566			0,95	1
	12,5 URD 73 D 11 A 0450	D300567			0,95	1
	12,5 URD 73 D 11 A 0500	E300568			0,90	1
	12,5 URD 73 D 11 A 0550	F300569			0,90	0,95
	12,5 URD 73 D 11 A 0630	G300570			0,85	0,95
	12 URD 73 D 11 A 0700	H300571			0,85	0,90
	11 URD 73 D 11 A 0800	J300572			0,85	0,90
	10 URD 73 D 11 A 0900	K300573			0,80	0,85
	9 URD 73 D 11 A 1000	L300574			0,80	0,85
	9 URD 73 D 11 A 1100	M300575			0,75	0,80







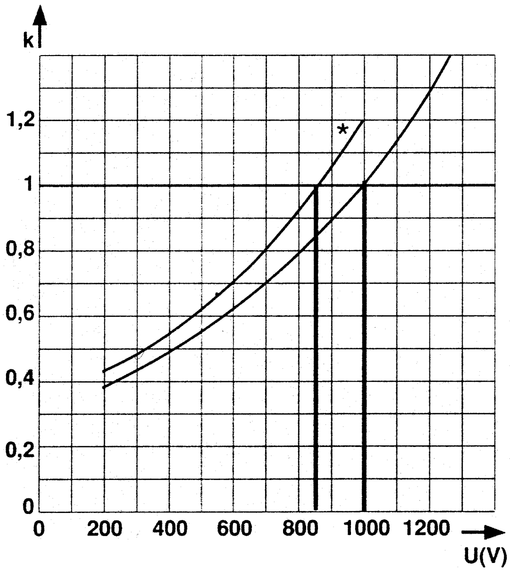
Pull out grip PM7 (V097676) in size 70-71-72

Microswitches supplied separately (see page 420)

	A	B	C	D	$E^{\pm1,1}$	F	H	J	K	$L^{\pm1,5}$	M	N	R	e
70	40	46,5	82	71	100,4	21	25	10,5	17,7	133,4	11,5	18,5	25,2	6
71	51	56,5	91	71	100,4	25,5	25	10,5	17,7	133,4	11,5	18,5	25,2	6
72	60	65,5	100	71	100,4	30	32	10,5	21,2	133,4	11,5	18,5	25,2	6
73	74,5	79,5	114	72	100,4	37,2	40	10,5	25,2	133,4	11	18	25,2	6

Fuse holders	Ref. N°	a	b	c	e1	x	y	Weight (g)
SI DIN 110 630 A	F098031	40	68	82	5	215	245	1060
SI DIN 110 1250 A	L091941	45	73	87	10	215	245	1320

Multiplier coefficient



Left: Mean curve indicating variation of total I²t (I²t $_t$) and total operating time T_t in accordance with working voltage U.

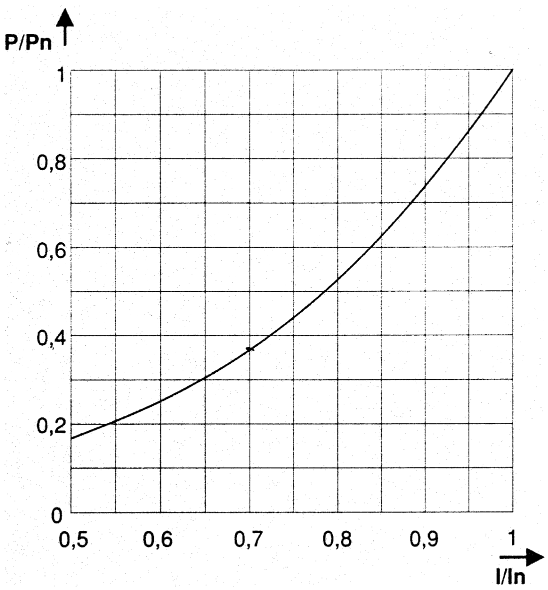
Example:
Fuse 350 A in size 30.
I_p = 10 000 A U = 500 V

At 660 V
I²t $_t$ = 80 000 A²s T_t = 6 ms

At 500 V
I²t $_t$ = 80 000 x 0.72 = 57 600 A²s
T_t = 6 x 0.72 = 4.3 ms

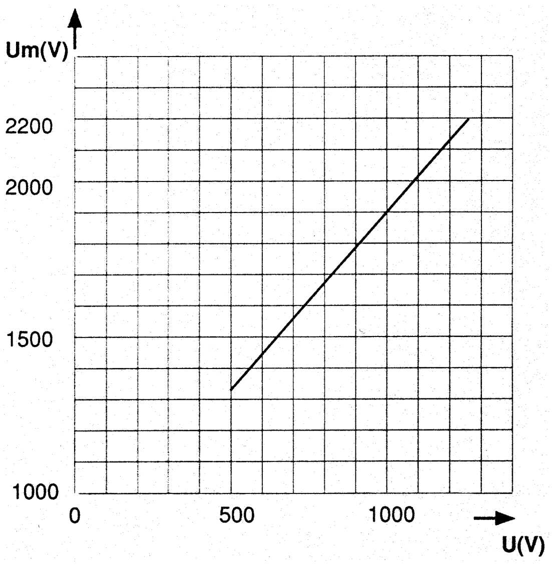
* curve for fuses page 278 with P²t published at 850VAC

Dissipated power



Above left: Curve enabling calculation of dissipated power P by a fuse rated I_N, as a function of the RMS current I, in multiples of I_N, in steady state.

Arc voltage



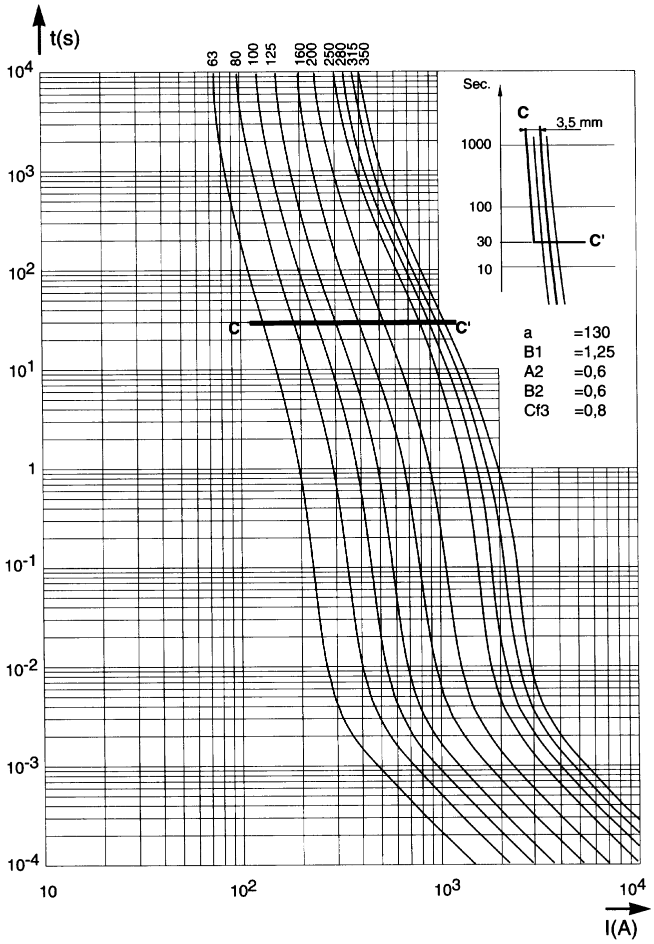
Above right: Curve indicating peak arc voltage Um which may appear across fuse terminals as a function of working voltage U at cos φ = 0.15

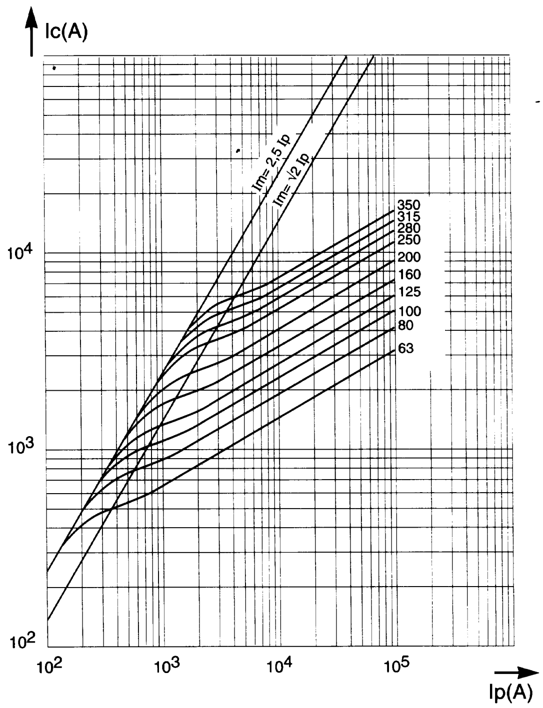
Ferraz Shawmut

American and European Square-body Fuses

PSC

Size 70



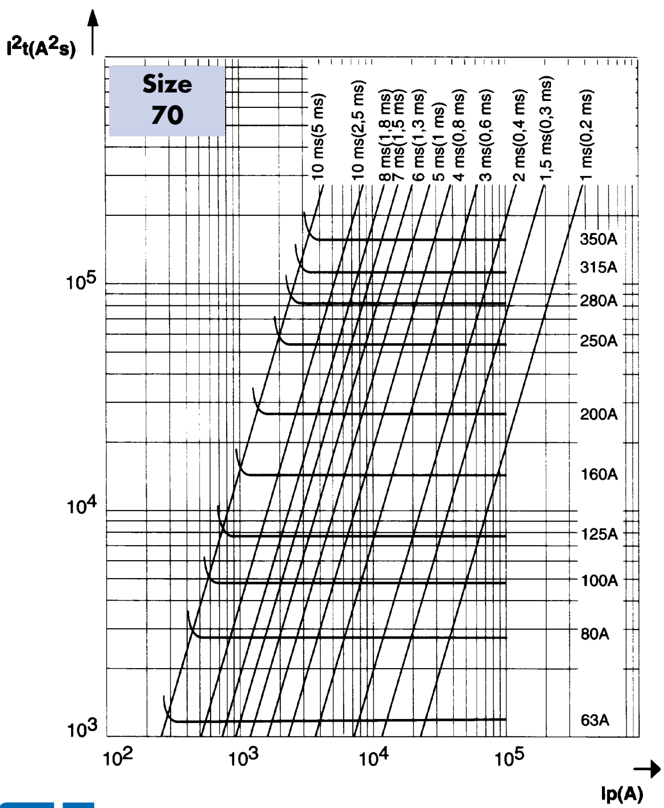


Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.

Time-current characteristics

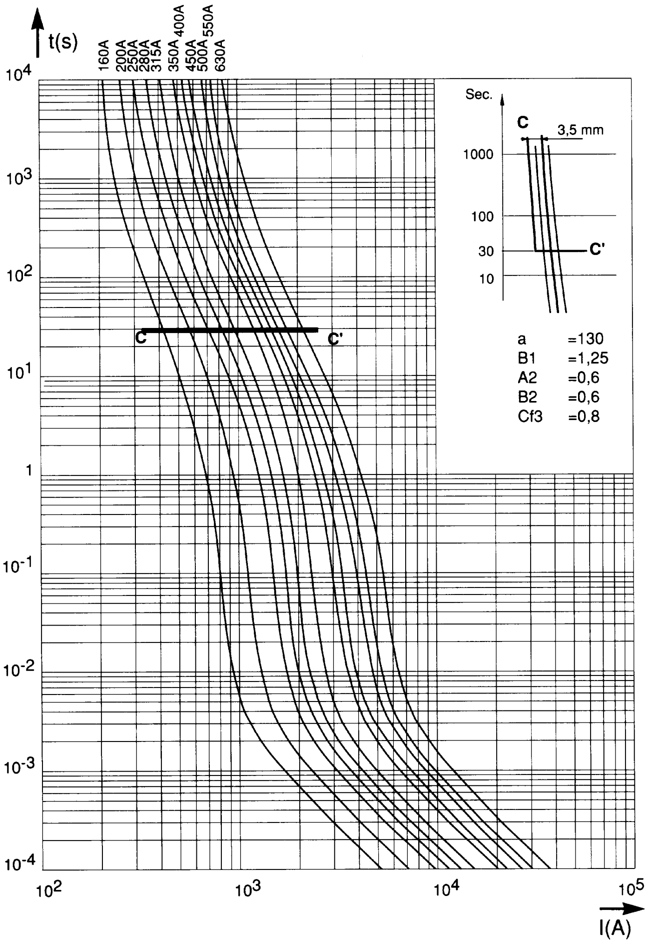
Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.
- Tolerances on this current ± 8 %.
- Beyond 30 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



Maximum values of total operating I²t and total operating times

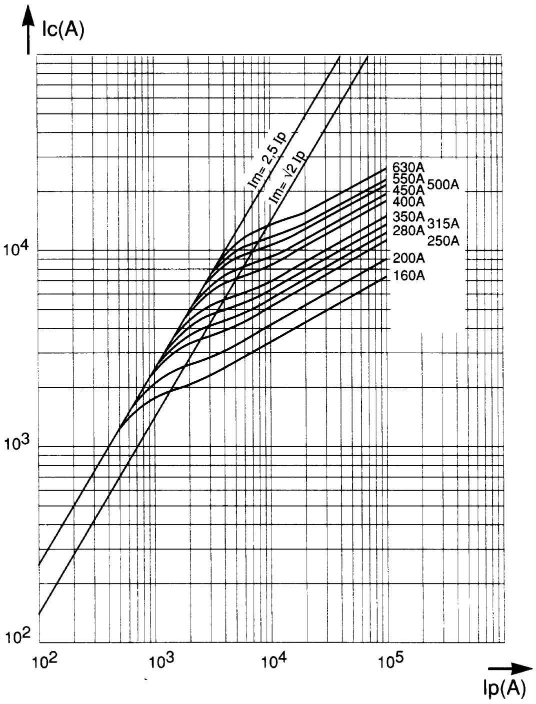
Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 1000V or 850 V(*), cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

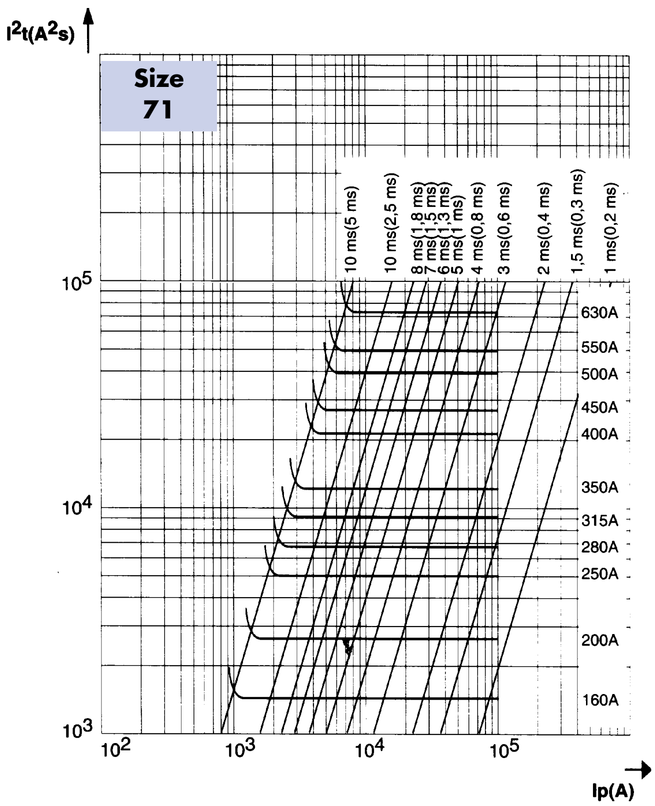
* See page 278, (1)



Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.





Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.

- Tolerances on this current ± 8 %.
- Beyond 30 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.

Maximum values of total operating I²t and total operating times

Left: Horizontal curves indicating the maximum values of total operating I^2t (I^2t_t) as function of the prospective current I_p at 1000V or 850 V(*), cos φ = 0.15.

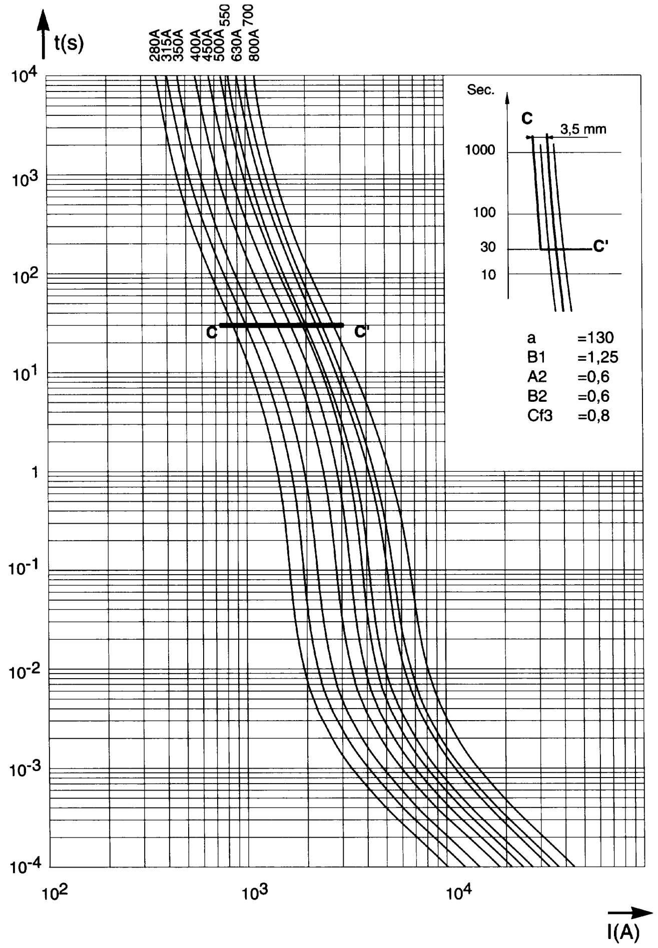
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

* See page 278, (1)

Ferraz Shawmut

PSC

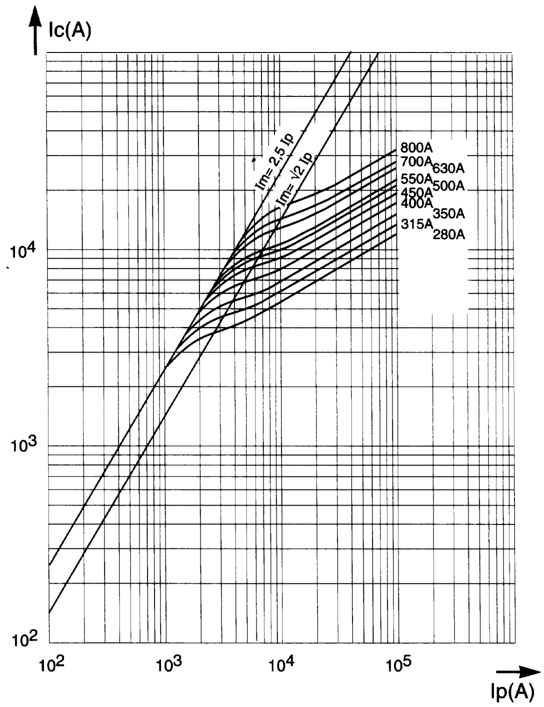
Size 72

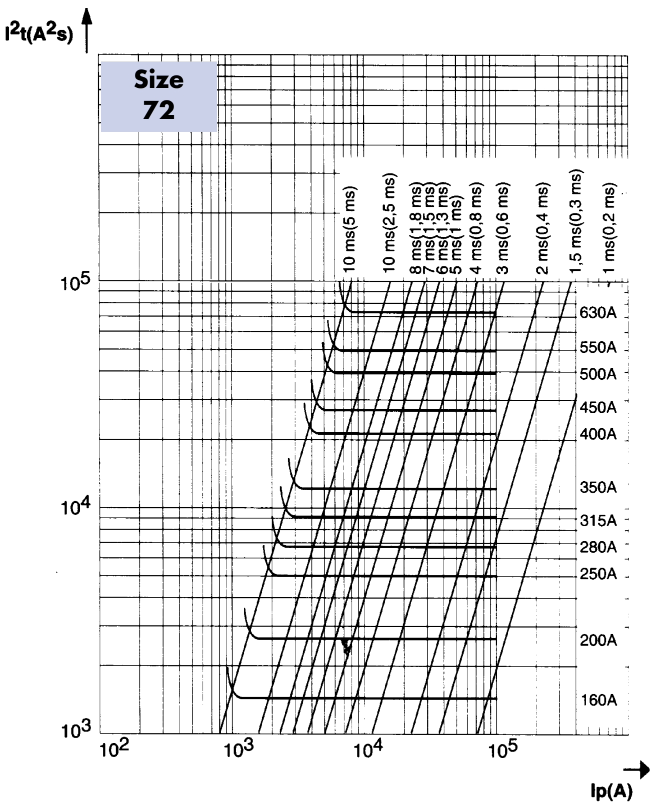


Size 72

Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.





Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.

- Tolerances on this current ± 8 %.
- Beyond 30 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.

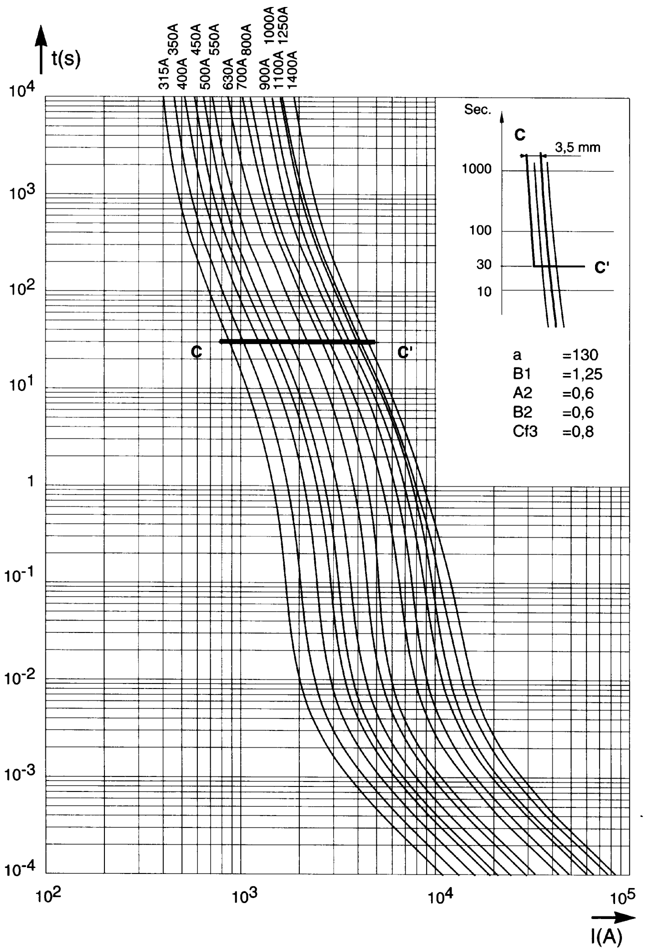
Maximum values of total operating I^2t and total operating times

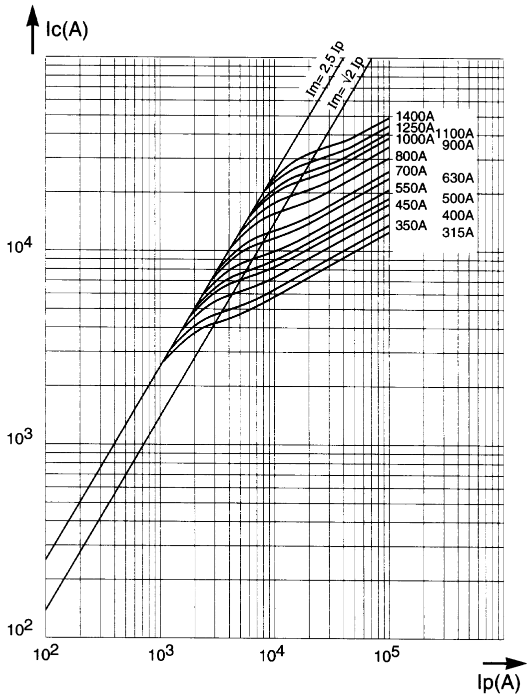
Left: Horizontal curves indicating the maximum values of total operating I^2t (I^2t_t) as function of the prospective current I_p at 1000V or 850 V(*), cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

* See page 278, (1)

PSC

Size 73



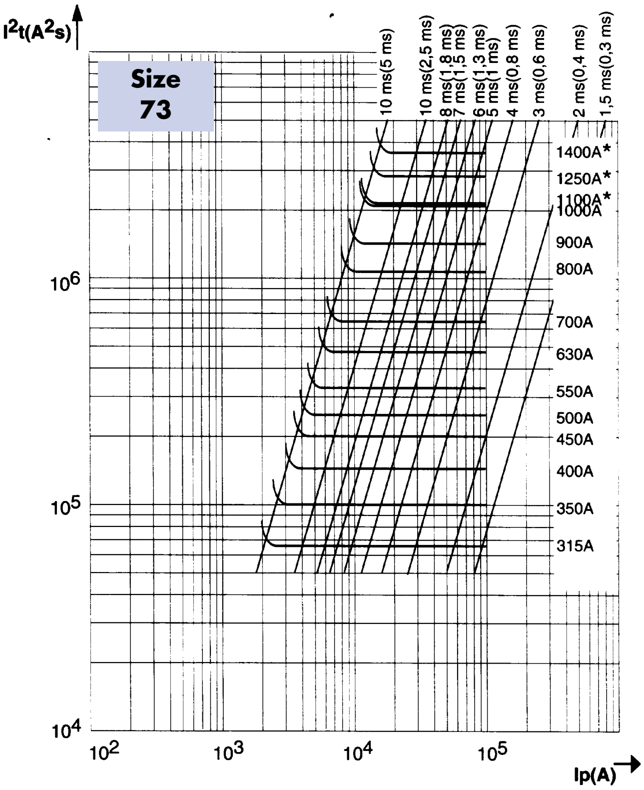


Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.

Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.
- Tolerances on this current ± 8 %.
- Beyond 30 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



Maximum values of total operating I²t and total operating times

Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 1000V or 850 V(*), cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

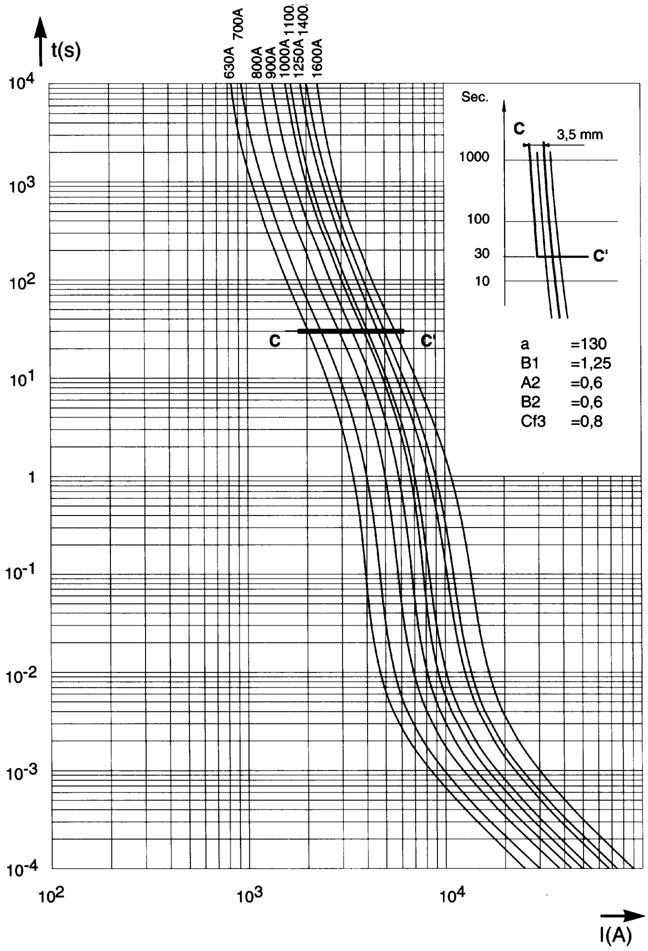
* See page 278, (1)

Ferraz Shawmut

Semiconductor Fuses

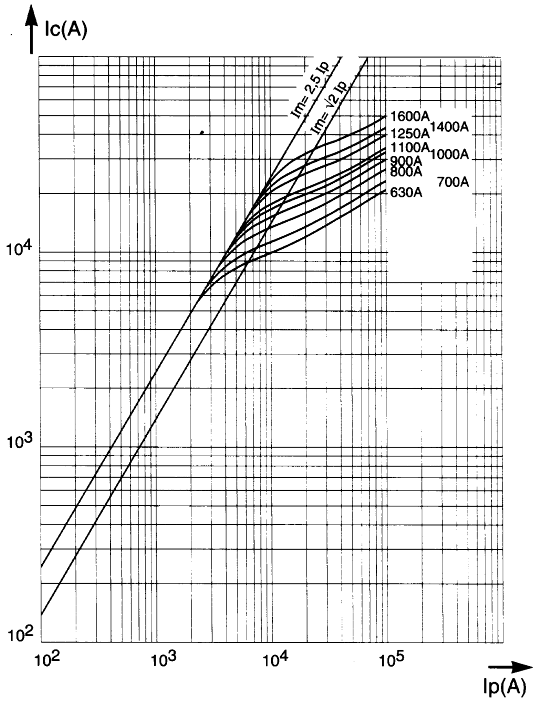
American and European Square-body Fuses

PSC **Size 2x72**



Cut-off characteristics

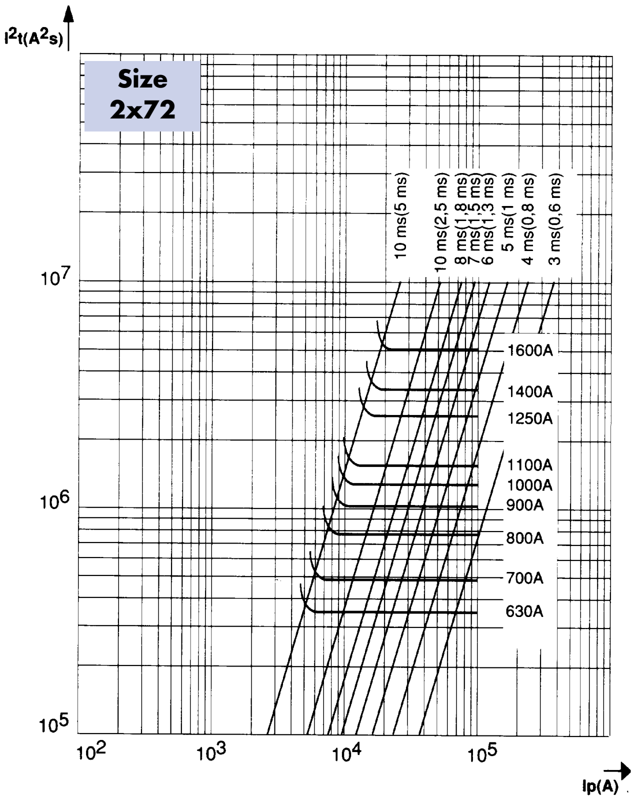
Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.

- Tolerances on this current ± 8 %.
- Beyond 30 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.

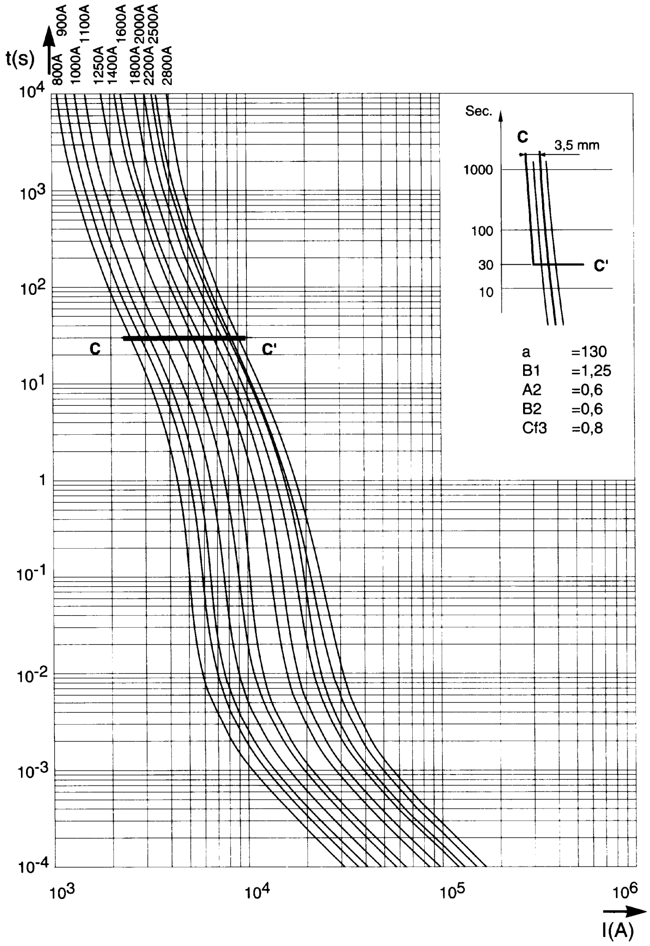


Maximum values of total operating I²t and total operating times

Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 1000V or 850 V(*), cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

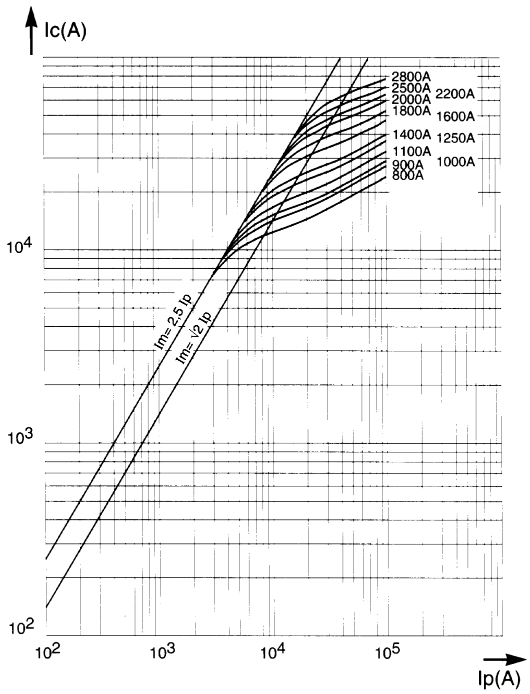
* See page 278, (1)

PSC **Size 2x73**



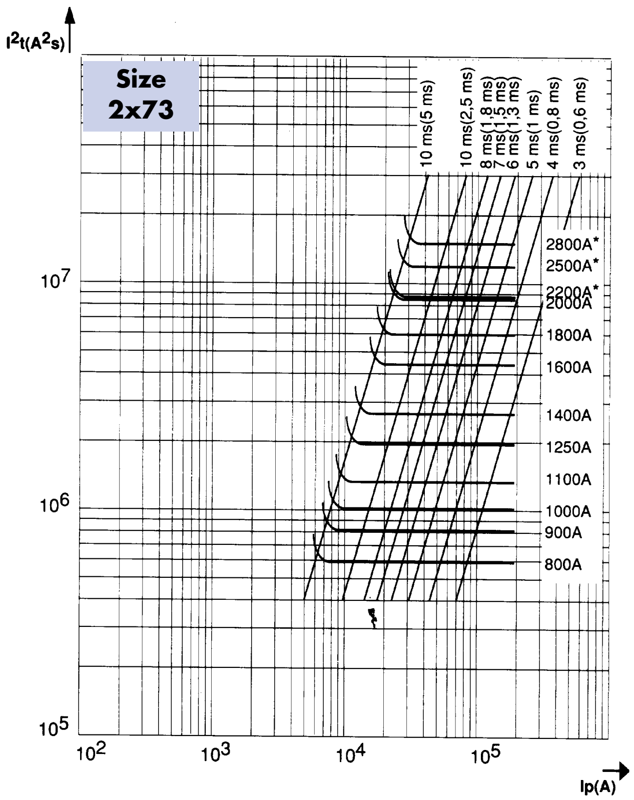
Cut-off characteristics

Below, right: Curves indicating for each rated current the peak value I_c that the current may reach as a function of the prospective fault current I_p.



Time-current characteristics

Above, left: Curves indicating pre-arcing time for each rated current as a function of RMS value of pre-arcing current I.
- Tolerances on this current ± 8 %.
- Beyond 30 sec, small overloads must be eliminated by another device.
- Curve CC' represents the maximum times taken by the associated device to clear small overloads; only its horizontal line is represented. Its oblique line must be plotted according to sketch, top right corner.
- The intersection of the fuse and CC' curves indicates the minimum breaking current I_{pm} of the fuse.



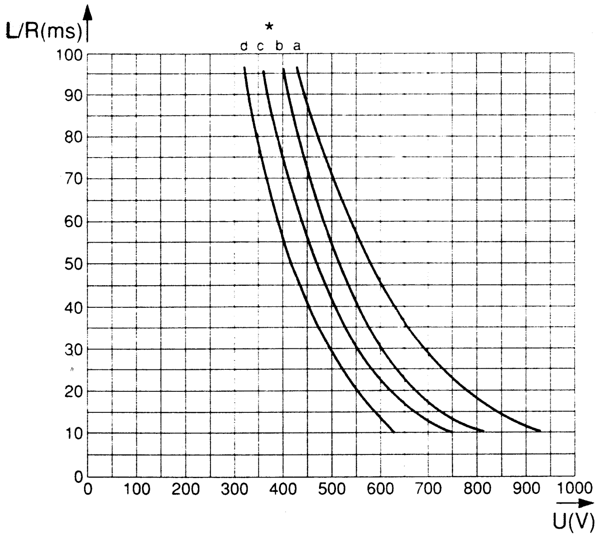
Maximum values of total operating I²t and total operating times

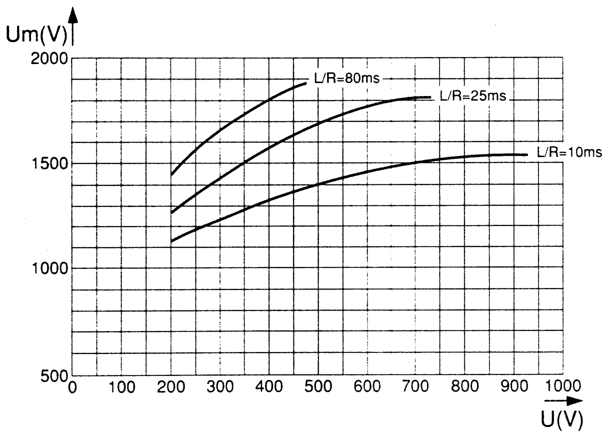
Left: Horizontal curves indicating the maximum values of total operating I²t (I^2t_t) as function of the prospective current I_p at 1000V or 850 V(*), cos φ = 0.15.
The oblique lines indicate the corresponding total operating time T_t, with pre-arcing time in brackets.

* See page 278, (1)

PSC 650 to 1300VAC fuses DC Performances

DC working voltage possibilities





Rated current I_N (A)	Curves (*) and Ipm (¹) corresponding to the rating					
	70 * Ipm (A)	71 * Ipm (A)	72 * Ipm (A)	73 * Ipm (A)	2x72 * Ipm (A)	2x73 * Ipm (A)
63	a 270					
80	a 400					
100	a 520					
125	a 700					
160	a 950	a 950				
200	a 1300	a 1300				
250	a 1800	a 1800				
280	b 2200	a 2000	a 1800			
315	b 2600	a 2300	a 2200	a 2000		
350	c 3000	a 2700	a 2600	a 2400		
400		b 3500	a 3400	a 3000		
450		b 4000	a 3800	a 3500		
500		c 4800	a 4600	a 3900		
550		c 5200	b 5000	a 4400		
630		c 6400	b 6200	a 5300	a 4400	
700			c 6800	a 6000	a 5200	
800			c 8000	b 8000	a 6400	a 6000
900				b 9000	a 7600	a 7000
1000				c 11000	a 9200	a 7800
1100				c 12000	b 10000	a 8800
1250				c 13500	b 12400	a 10600
1400				c 15000	c 13600	a 12000
1600					c 16000	b 16000
1800						b 18000
2000						c 22000
2200						c 24000
2500						d 27000
2800						d 30000

Top: Curves indicating the maximum time constant L/R of the fault path as a function of the DC voltage U, for the rated currents in the sizes indicated in the table.

Ipm (1) values indicate the minimum breaking current in Amperes (A).

Remark:
When the fault current di/dt is very large, this condition can be exceeded. It is the case for faults occurring in voltage commutated inverters.

Below: Curves indicating peak arc voltage Um which may appear across fuse terminals as a function of the DC working voltage U, for various time constant L/R of fault path.

Other ceramic-body fuses 500V to 10KV / 100 A to 1000A

Ferraz Shawmut offers comprehensive expertise in semiconductor fuse applications worldwide.

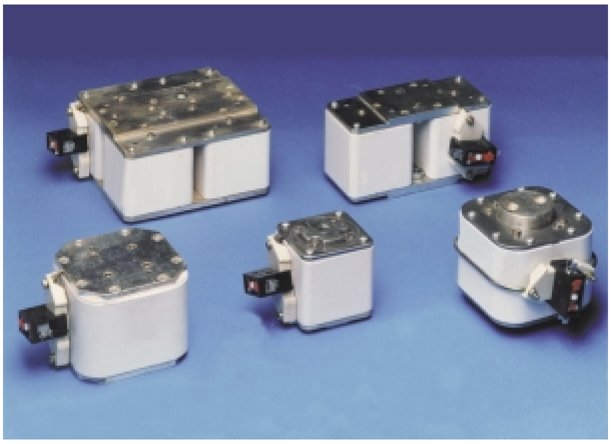
We apply our specialized knowledge in this field to design fuses for specific applications, such as:

- large rectifiers for electrolysis and railway substations
- large AC and DC drives for heavy industry
- frequency converters
- cycloconverters

These special application fuses are not presented here. We invite you to consult Ferraz Shawmut for your special needs:

- Large fuse ratings: 500 V 10000 A - 700 V 8400 A - 1000 V 6400 A
- Medium voltage fuses: 1500 V - 2000 V - 3000 V - 6000 V - 7200 V - 10000 V ratings from 100 A up to 1000 A.
- Pyristor system: an ultra-rapid medium voltage system controlled by an external signal, capable of very quickly limiting a short circuit current for the protection of: semiconductors, existing medium voltage circuit-breaker panels, motors, transformers...

2.5 kV	2.6 kA and 4.5 kA
7.2 kV	4 kA
11 kV	4 kA
20 kV	3 kA





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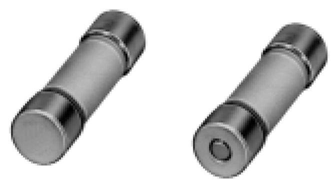
European Fuses

French Ferrule

A050-060 UR

600 V AC
URD - from 0.10 to 0.80 A**
500 V AC
URB - URD - URL from 1 up to 30 A
Size: 10x38

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS COMPLYING WITH IEC STANDARD 269.1 AND 4
- 500 - 600 V AC VOLTAGE RATING
- aR-CLASS ACCORDING TO VDE 636-23 AND IEC 269.4
- WITHOUT BLOWN FUSE INDICATION ACCORDING TO NF C 63210 AND 63211 - 0.10 up to 0.80 A**
- WITH BUILT-IN TRIP-INDICATOR (1 to 30 A), A FERRAZ SHAWMUT SPECIALITY*



MAIN CHARACTERISTICS

Voltage rating U_N (VAC)	Class	Current rating I_N (A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ U_N I^2t_t (A^2s)	Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating
600 V without blown fuse indication	URD **	100 mA		$1.2\ 10^{-3}$	0.23	0.4	200 kA @ 600 V
		125 mA		$2.3\ 10^{-3}$	0.25	0.44	
		160 mA		$5.2\ 10^{-3}$	0.28	0.48	
		200 mA		$8\ 10^{-3}$	0.34	0.58	
		250 mA		$18\ 10^{-3}$	0.35	0.60	
		315 mA		$33\ 10^{-3}$	0.42	0.73	
		400 mA		$56\ 10^{-3}$	0.46	0.80	
		500 mA		0.100	0.46	0.80	
		630 mA		0.18	0.52	0.90	
		800 mA		0.44	0.58	1	
500 V with trip-indicator	URD	1 A	0.49	1.3	0.4	0.7	50 kA @ 500 V
		1.25 A	0.13	1.7	0.52	0.91	
		1.6 A	0.31	2.2	0.58	1	
		2 A	0.65	3.1	0.63	1.1	
		2.5 A	1.65	5.9	0.63	1.1	
		3.15 A	2.80	9	0.86	1.5	
		4 A	5.30	16	1.1	1.8	
		5 A	12.7	36	1.1	1.8	
	URB	6 A	1.3	47	0.73	1.35	50 kA @ 500 V
		8 A	2.3	80	0.,83	1.55	
		10 A	3.6	110	1	1.9	
		12 A	5.25	150	1.3	2.3	
		16 A	9.30	200	1.7	3.1	
		20 A	16	290	1.7	3.2	
	URL	25 A	37	580	2.9	4.25	50 kA @ 500 V
		30 A	58	900	3.5	5.1	

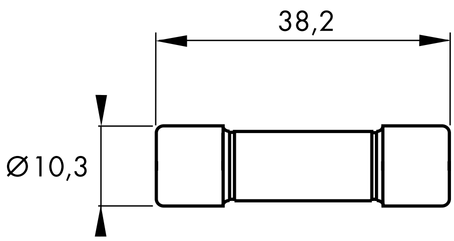
* minimum operating voltage for trip-indicator: 20 V
** higher ratings 1 to 30 A see A070 gRB 30 T13 - Publication F 600190

European Fuses

French Ferrule

A050-060 UR

10.3x38 - Without blown fuse indicator

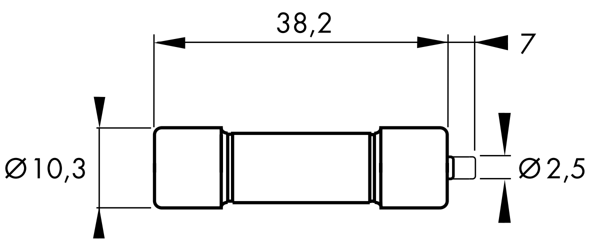


Fuses mounted in clips or ST fuse disconnectors see Fuse Blocks and Fuse Holders

Current Rating	Catalog Number	Ref. Number
100 mA	A 060 URD 0.100 T13	H077632
125 mA	A 060 URD 0.125 T13	J077633
160 mA	A 060 URD 0.160 T13	K077634
200 mA	A 060 URD 0.200 T13	L077635
250 mA	A 060 URD 0.250 T13	M077636
315 mA	A 060 URD 0.315 T13	N077637
400 mA	A 060 URD 0.400 T13	P077638
500 mA	A 060 URD 0.500 T13*	Q077639
630 mA	A 060 URD 0.630 T13*	R077640
800 mA	A 060 URD 0.800 T13*	S077641

* UL Recognized

10.3x38 - With blown fuse trip-indicator



Current Rating	Catalog Number	Ref. Number
1 A	A 050 URD 001 T13 I	P076925
1.25 A	A 050 URD 001.2 T13 I	H076597
1.6 A	A 050 URD 001.6 T13 I	G076596
2 A	A 050 URD 002 T13 I	Q076926
2.5 A	A 050 URD 002.5 T13 I	F076595
3.15 A	A 050 URD 003 T13 I	R076927
4 A	A 050 URD 004 T13 I	S076928
5 A	A 050 URD 005 T13 I	T076929
6 A	A 050 URB 006 T13 I	V076930
8 A	A 050 URB 008 T13 I	W076931
10 A	A 050 URB 010 T13 I	X076932
12 A	A 050 URB 012 T13 I	Y076933
16 A	A 050 URB 016 T13 I	Z076034
20 A	A 050 URB 020 T13 I	A076935
25 A	A 050 URL 025 T13 I	B076936
30 A	A 050 URL 030 T13 I	C076937

Fuses with trip indicator mounted in clips - See Fuse Blocks and Fuse Holders and Medium Voltage fuse clips sections

French Ferrule

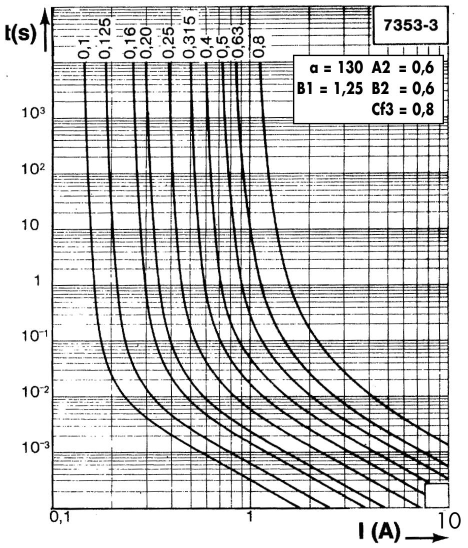
A050-060 UR

ELECTRICAL CHARACTERISTICS

Time vs current characteristics

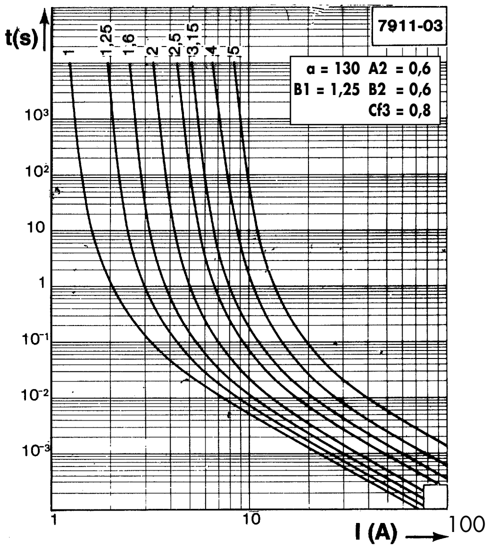
Without blown fuse indicator

600 V URD • 100 mA → 800 mA



With trip indicator

500 V URD • 1 A → 5 A

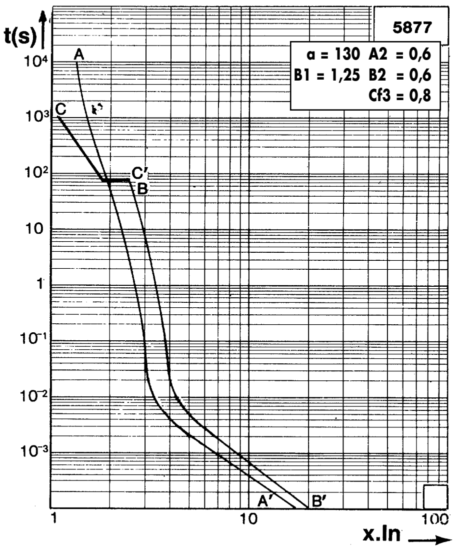


These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

Tolerance for mean pre-arcing current ± 10%

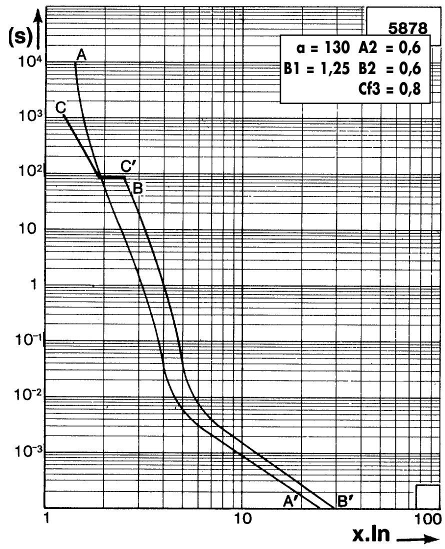
With trip indicator

500 V JRB • 6 A → 20 A



With trip indicator

500 V URL • 25 A – 30 A

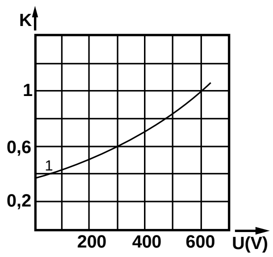


These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.
as a multiple of current rating.

French Ferrule A050-060 UR

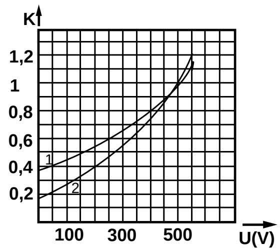
Corrective factor - Peak arc voltage

Corrective factor



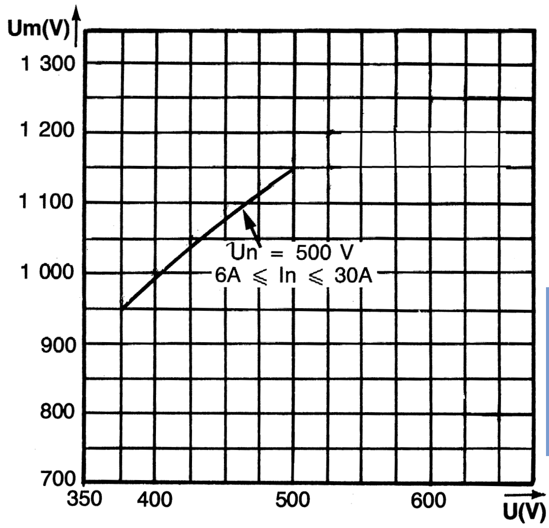
600 V UR
1 : 0.1 up to 0.8 A

These mean curves show the variation of the total clearing time (I^2t_t) and the total clearing duration t_t as a function of operating voltage U.



500 V UR
1 : 1 up to 5 A
2 : 6 up to 30 A

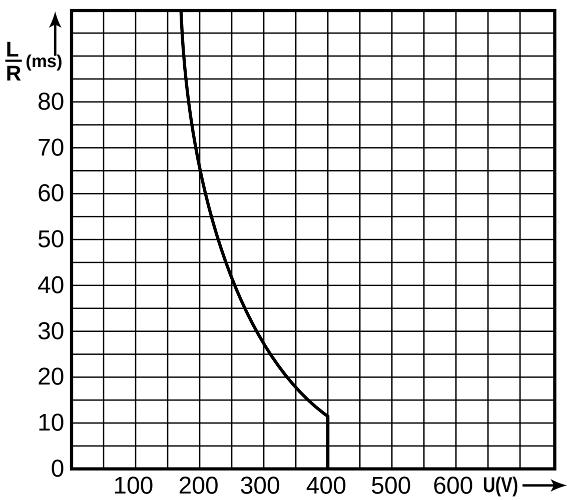
Peak arc voltage



This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of the operating voltage U @ cos φ = 0.15.

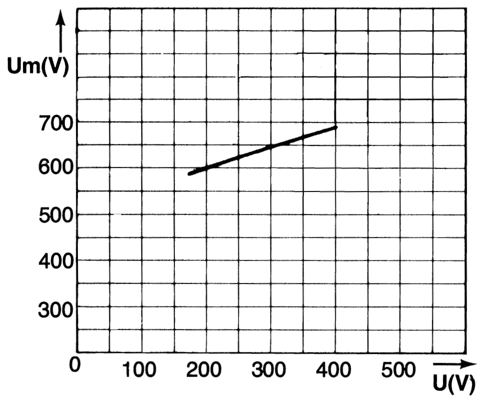
D.C. Application data for fuses with trip indicator

500 V URD IN < 6A



This curve indicates the permissible value of time constant L/R as a function of DC working voltage

500 V URD IN >= 6A



This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of the operating voltage U.

European Fuses

French Ferrule

660 gRB



660 V AC
gRB - from 1 up to 30 A
Size: 10x38

The fuse preselection table below indicates:

- rated current (or rating) I_N
- pre-arcing I^2t (I^2t_p) at 1 ms
- total operating I^2t (I^2tt) at 660 V, cos φ=0.15, and for a total operating time from 8 to 10 ms
- dissipated power P_N at the rated current I_N, and at 0.8 I_N, in steady state
- Nominal breaking capacity, checked by tests made in accordance with IEC standard.

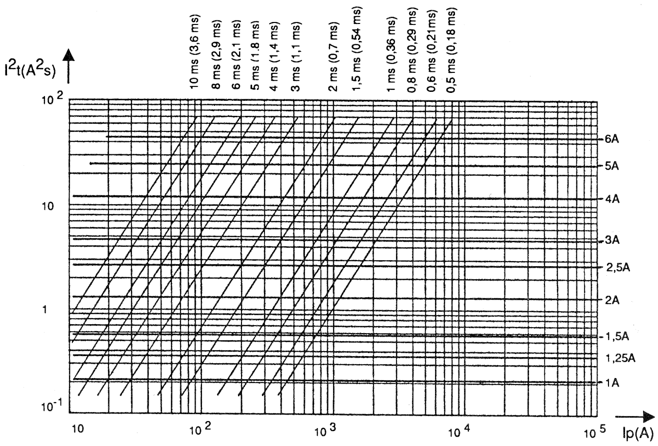
Fuse preselection

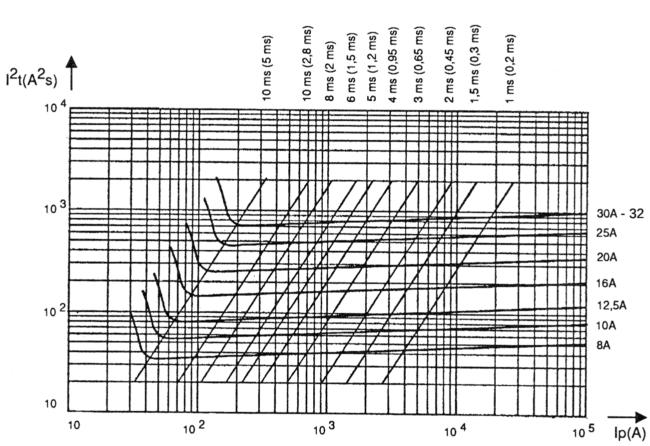
Rated current	Pre-arcing I^2t	Total I^2t at 660VAC	Dissipated power		Peak arc voltage	Breaking capacity
I_N (A)	I^2t_p (A^2s)	I^2t (A^2s)	at I_N	at 0.8 I_N	(V)	I (kA)
1	0,066	0,21	1	0,57	2500	160 kA 700 V (US)
1,25	0,115	0,36	1,25	0,7		
1,5	0,185	0,57	1,5	0,81		
2	0,42	1,3	2	1,1		
2,5	0,88	2,7	2,1	1,15		
3	1,55	4,6	2,3	1,25		
4	4	12	2,6	1,35		
5	8,6	25	2,7	1,4		
6	15	44	2,9	1,5		
8	3,3	33	2,4	1,35	1450	
10	5,4	55	3,4	1,85		
12,5	8,5	82	3,4	1,9		
16	16	145	4,1	2,3		
20	30	250	4,3	2,4		
25	58	470	4,7	2,7		
30 - 32	96	740	5	2,9		

French Ferrule

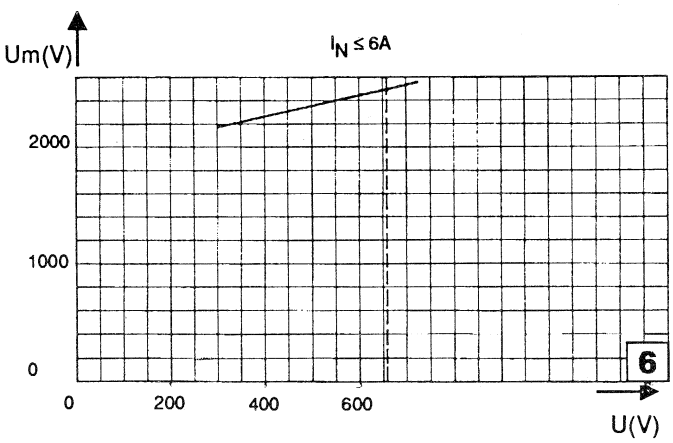
660 gRB

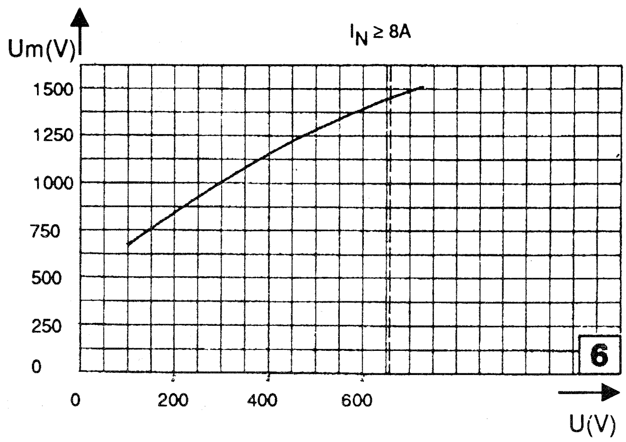
Maximum values of total operating I²t and total operating times



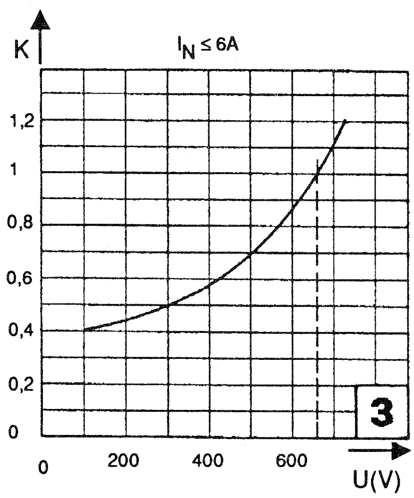


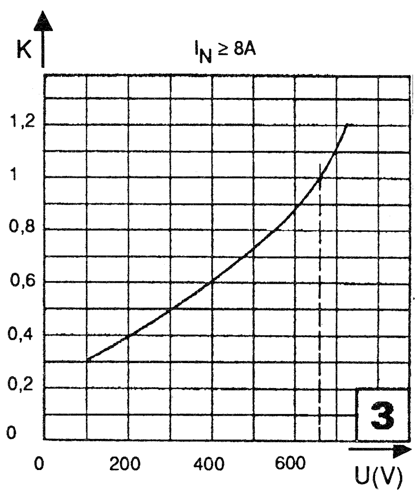
Arc voltage





Multiplier coefficient





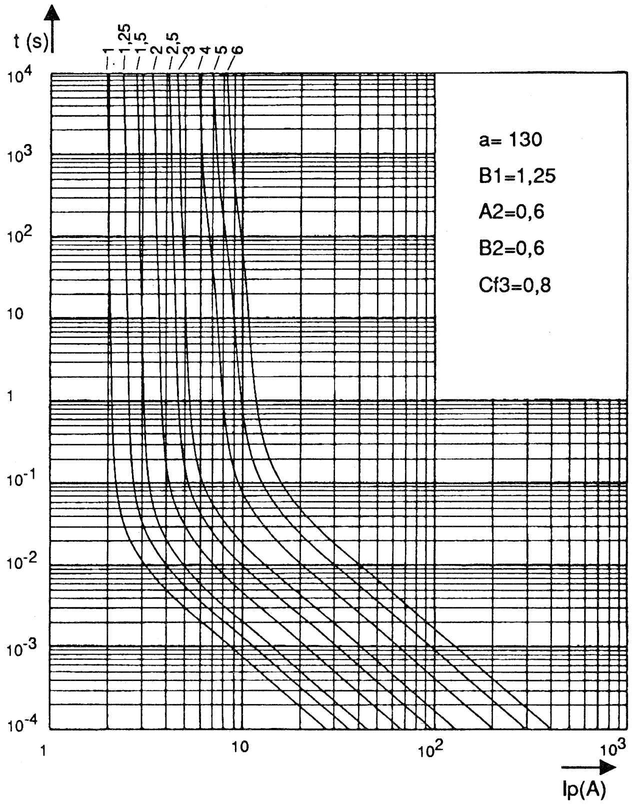
Semiconductor Fuses

European Fuses

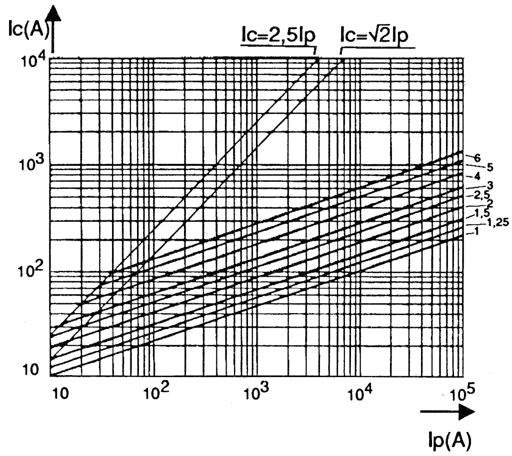
French Ferrule

660 gRB

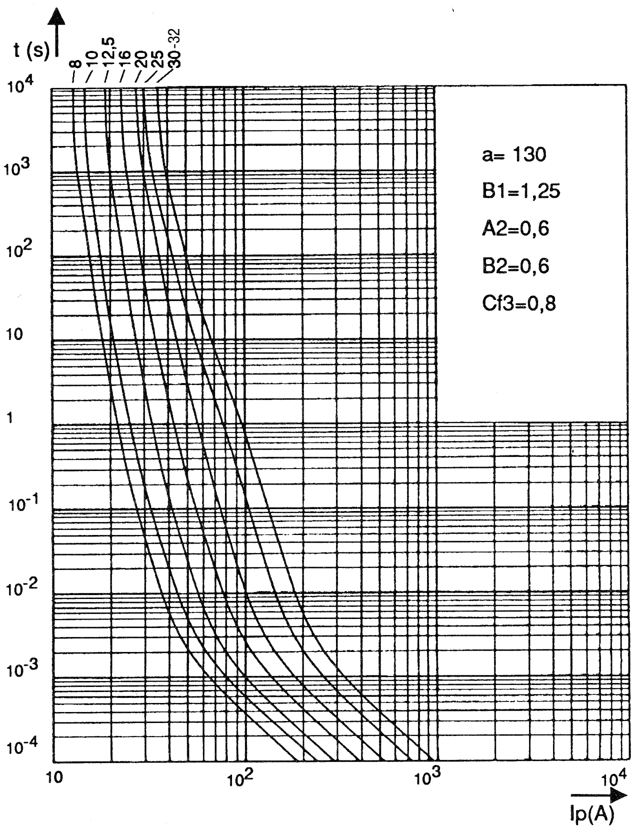
Time-current characteristics (1 to 6 A)



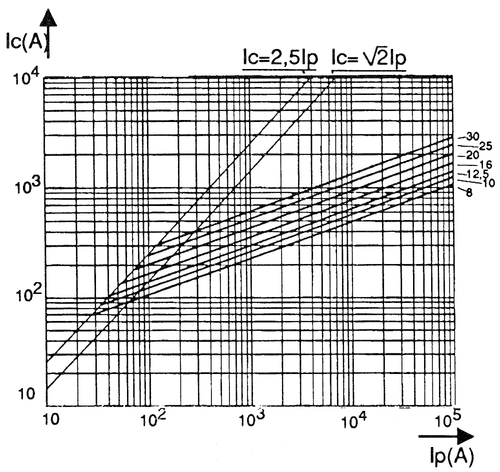
Cut-off characteristics



Time-current characteristics (8 to 30 A)



Cut-off characteristics



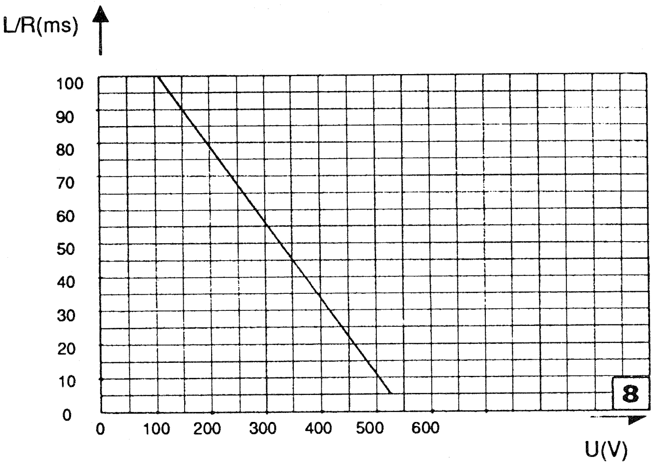
Semiconductor Fuses

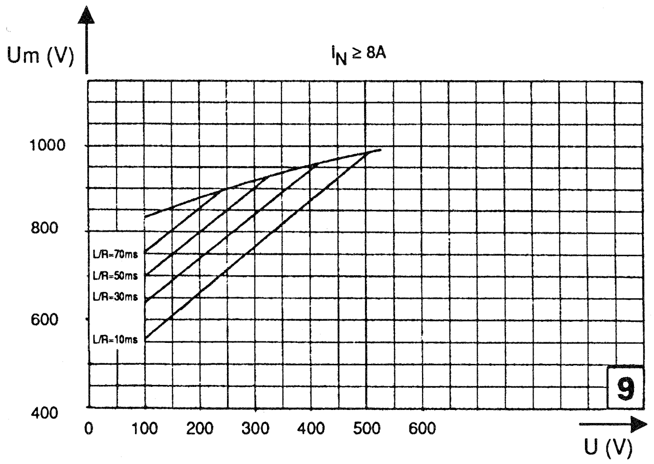
European Fuses

French Ferrule

660 gRB

DC working voltage possibilities





Above: Curve indicating the maximum time constant L/R of the fault path as a function of the DC voltage U, for the rated currents from 1 to 30 A of this range.

Far left (top and bottom): Curves indicate, for each rated current, pre-arcing time as a function of RMS value of pre-arcing current I.

Tolerances on this current:

±10% = ratings from 1 to 6 A

±9% = ratings from 8 to 30 A

Fuses with "gR" characteristics can eliminate all overloads. They do not show any minimum breaking capacity but limit currents of non-operation or operation in compliance with standard VDE 636/23.

Near left (top and bottom): Curves indicate, for each rated current, the peak value Ic that the current may reach as a function of prospective fault current Ip.

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

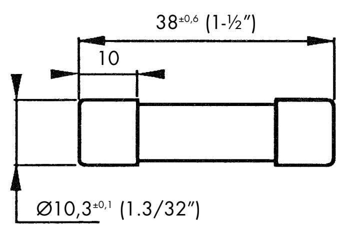
Dimensions / Reference / Ref. No.

Rating (A)	Catalog Number	Ref. Number
1	660 gRB 10-01 A070 gRB 01 T13	W330000
1,25	660 gRB 10-1,25 A070 g RB 1.25 T13	X330001
1,5	660 gRB 10-1,5 A070 gRB 1.5 T13	Y330002
2	660 gRB 10-02 A070 gRB 02 T13	Z330003
2,5	660 gRB 10-2,5 A070 gRB 2.5 T13	A330004
3	660 gRB 10-03 A070 gRB 03 T13	B330005
4	660 gRB 10-04 A070 gRB 04 T13	C330006
5	660 gRB 10-05 A070 gRB 05 T13	D330007
6	660 gRB 10-06 A070 gRB 06 T13	E330008
8	660 gRB 10-08 A070 gRB 08 T13	F330009
10	660 gRB 10-10 A070 gRB 10 T13	G330010
12,5	660 gRB 10-12,5 A070 gRB 12.5 T13	H330011
16	660 gRB 10-16 A070 gRB 16 T13	J330012
20	660 gRB 10-20 A070 gRB 20 T13	K330013
25	660 gRB 10-25 A070 gRB 25 T13	L330014
30	660 gRB 10-30 A070 gRB 30T13	M330015
32	660 gRB 10-32 A070 gRB 32T13	Y330278

Without trip-indicator

Max. weight 10g

Packaging: per 10 pieces



Note: fuses bear European and American reference.

Semiconductor Fuses

European Fuses

French Ferrule — 6.600-6.621 cp UR

660 V AC
URC - URD from 6 up to 100 A
Sizes: 14x51 - 22x58

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMI CONDUCTORS COMPLYING WITH IEC STANDARD269.1 AND 4
- 660 V AC VOLTAGE RATING
- aR-CLASS ACCORDING TO VDE 636-23 AND IEC 269.4
- TWO MODELS ACCORDING TO NF C 63210 AND 63211 WITH AND WITHOUT BUILT-IN BLOWN FUSE TRIP-INDICATOR FOR SIZES 14 x 51 AND 22 x 58
- UL RECOGNIZED c UR us (EXCEPT 6 A)*



MAIN CHARACTERISTICS

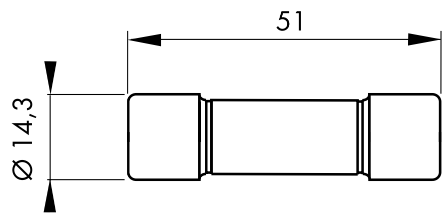
Voltage rating U_N(VAC)	Size	Class	Current rating I_N (A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ (A^2s) 660 V		Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating
660 V	14 x 51	URC	6	1.3	17.5*		1.1	2	100 kA @ 660 V
			8	2.4	27.5		1.6	2.8	
			10	4.3	40		2	3.5	
			12	5.4	60		2.45	4.4	
			16	13.2	100		2.7	4.8	
			20	27	160		2.9	5.2	
			25	53	275		3.2	5.8	
			32	98	500		3.9	7	
			40 (1)	130	700		6	10.7	
			50 (1)	280	1500		6.3	11.6	
	22 x 58	URD			$7 I_N < I_p < 30 I_N$	I_p 30 I_N			
			40 (2)	130	850	700	6	10.7	100 kA @ 660 V
			50 (2)	280	1850	1500	6.3	11.6	
		URD	25	22	125		5.2	10	100 kA @ 660 V
			32	49	275		5.7	11	
			40	88	480		6.8	13	
			50	155	800		7.8	14.9	
			63	350	1850		8.4	16	
			80	730	3800		9.4	17.8	
			100	1560	8000		10	19	

* Without trip-indicator I^2t : 15 A^2s.
(1) No trip-indicator available for this model.
(2) Models available only with trip-indicator.
Minimum operating voltage for built-in trip-indicator: 20 V.

French Ferrule 6.600-6.621 cp UR

All the fuses presented on this page are cURus (except 6 A)*

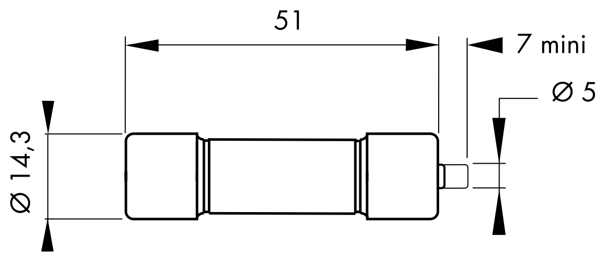
14x51 - Without blown fuse indication



Weight : 18g
Packaging : 10 pieces

Current Rating	Catalog Number	Ref. Number
6 A	6.600 CP URC 14.51/6*	K081475
8 A	6.600 CP URC 14.51/8	S093902
10 A	6.600 CP URC 14.51/10	T093903
12 A	6.600 CP URC 14.51/12	V093904
16 A	6.600 CP URC 14.51/16	W093905
20 A	6.600 CP URC 14.51/20	X093906
25 A	6.600 CP URC 14.51/25	Y093907
32 A	6.600 CP URC 14.51/32	Z093908
40 A	6.600 CP URC 14.51/40	A093909
50 A	6.600 CP URC 14.51/50	B093910

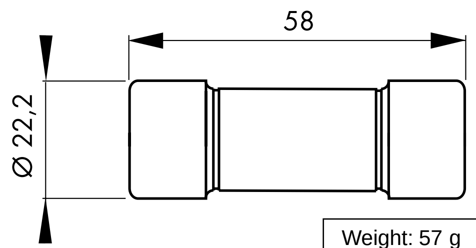
14x51 - With blown fuse trip-indicator



Weight : 18g
Packaging : 10 pieces

Current Rating	Catalog Number	Ref. Number
6 A	6.621 CP URC 14.51/6*	G081518
8 A	6.621 CP URC 14.51/8	C093911
10 A	6.621 CP URC 14.51/10	D093912
12 A	6.621 CP URC 14.51/12	E093913
16 A	6.621 CP URC 14.51/16	F093914
20 A	6.621 CP URC 14.51/20	G093915
25 A	6.621 CP URC 14.51/25	H093916
32 A	6.621 CP URC 14.51/32	J093917
40 A	6.621 CP URD 14.51/40	T100136
50 A	6.621 CP URD 14.51/50	V100137

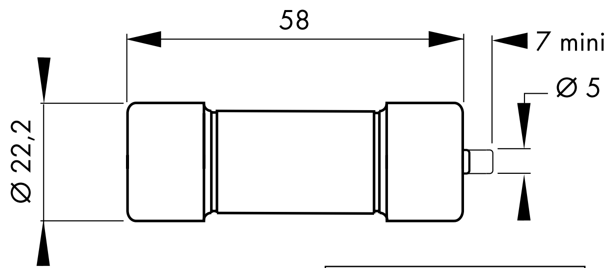
22x58 - Without blown fuse indication



Weight: 57 g
Packaging: 10 pieces

Current Rating	Catalog Number	Ref. Number
25 A	6.600 CP URD 22x58/25	B093956
32 A	6.600 CP URD 22x58/32	Z094828
40 A	6.600 CP URD 22x58/40	S094822
50 A	6.600 CP URD 22x58/50	W094779
63 A	6.600 CP URD 22x58/63	T094823
80 A	6.600 CP URD 22x58/80	A094829
100 A	6.600 CP URD 22x58/100	Y094827

22x58 - With blown fuse trip-indicator



Weight: 57 g
Packaging: 10 pieces

Current Rating	Catalog Number	Ref. Number
25 A	6.621 CP URD 22x58/ 25	H093801
32 A	6.621 CP URD 22x58/ 32	C093957
40 A	6.621 CP URD 22x58/ 40	J093802
50 A	6.621 CP URD 22x58/ 50	D093958
63 A	6.621 CP URD 22x58/ 63	K093803
80 A	6.621 CP URD 22x58/ 80	E093959
100 A	6.621 CP URD 22x58/100	F093960

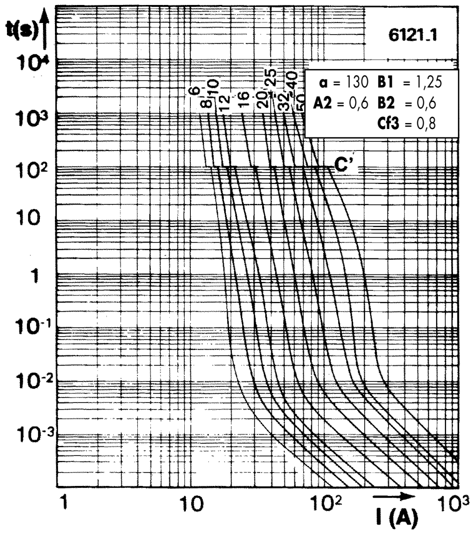
See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

European Fuses

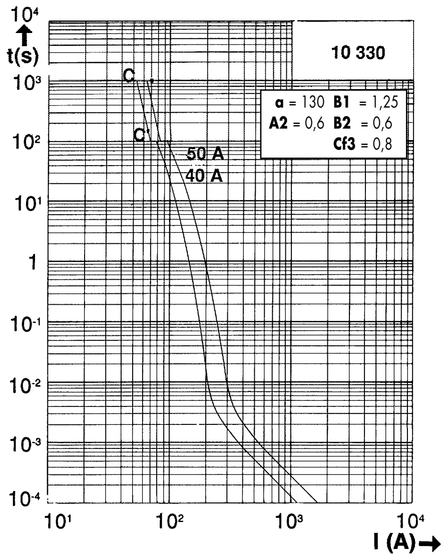
French Ferrule 6.600-6.621 cp UR

Time vs current characteristics

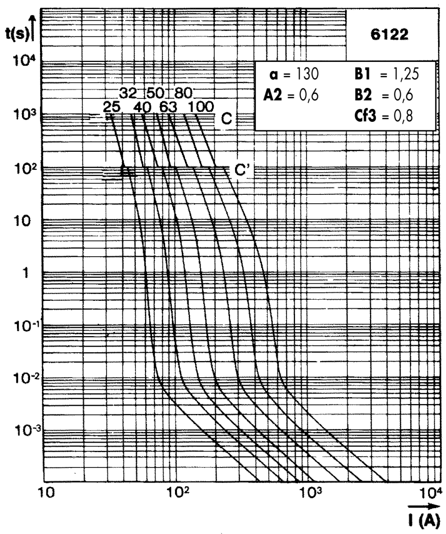
14x51 URC



14x51 URD



22x58 URD



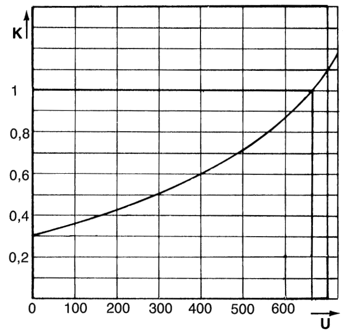
These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

Tolerance for mean pre-arcing current ± 10%

Corrective factor - Peak arc voltage

Corrective factor

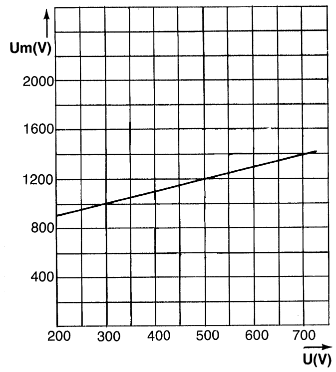
14x51 URC - URD



The mean curves show the variation of the total clearing time (I^2t_t) and the total clearing duration t_t as a function of operating voltage U.

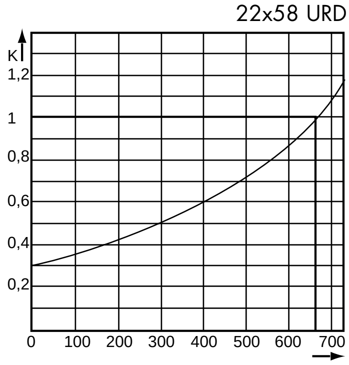
Peak arc voltage

14x51 URC - URD

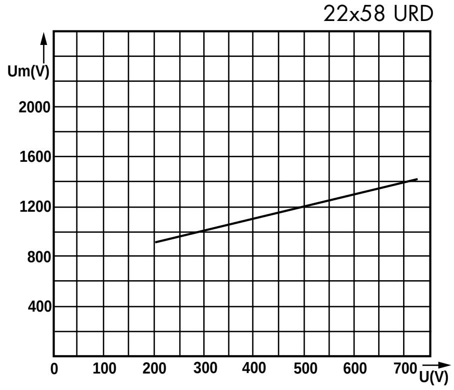


This curve shows the peak value Um of the arc voltage which appears across the fuse-link as a function of the operating voltage U @ cos φ = 0.15.

22x58 URD



22x58 URD

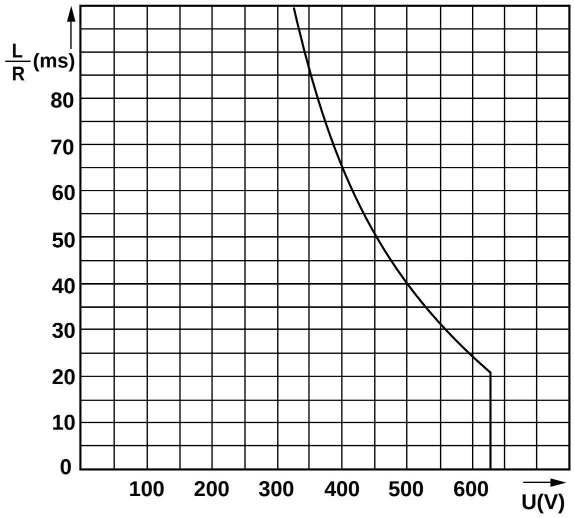


French Ferrule

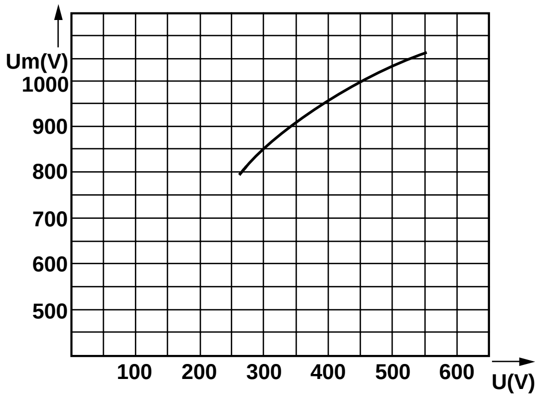
6.600-6.621 cp UR

DC Application data

14x51 URC - URD

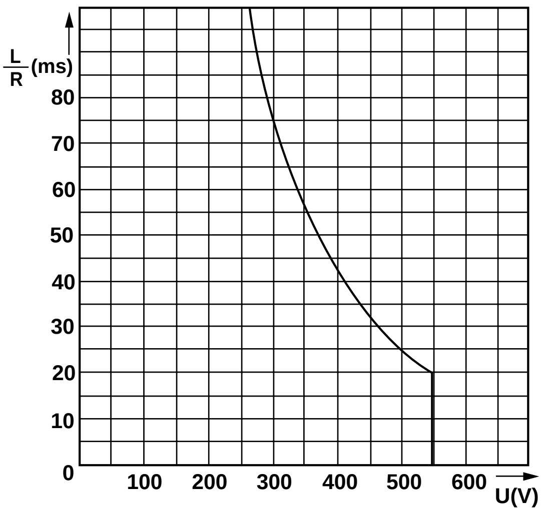


14x51 URC - URD

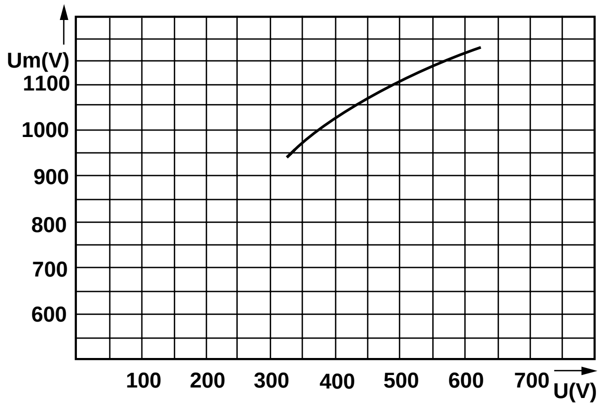


Minimum breaking current: see time-current characteristics

22x58 URD



22x58 URD



This curve indicates the permissible value of time constant L/R as a function of DC working voltage

This curve shows the peak value Um of the arc voltage which appears across the fuse-link as a function of the operating voltage U.

Semiconductor Fuses

European Fuses

French Ferrule

6.600-6.621 cp URG

600 V - 660 V AC
URGB - URGA - from 8 to 100 A
Sizes: 14x51 - 22x58

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 600 V - 660 V AC VOLTAGE RATING
- aR CLASS AS PER VDE 636-23 AND IEC 269.4
- TWO MODELS COMPLYING WITH NF C 63210 AND 63211 WITH AND WITHOUT BUILT-IN BLOWN FUSE TRIP-INDICATOR FOR SIZES 14 x 51 AND 22 x 58



MAIN CHARACTERISTICS

Voltage rating U_N(VAC)	Size	Class	Current rating I_N (A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ A^2s 660 V		Watts loss		Tested interrupting rating
					I_p 30 I_N	I_p > 30 I_N	0,8 I_N	I_N	
660 V	14 x 51	URGB	8	3.3	20	17	1.45	2.7	200 kA @ 660 V
			10	6.0	37	30	1.85	3.4	
			12	9.3	75	60	2.5	4.6	
			16	15.6	95	75	3.4	6.2	
			20	30.0	175	145	4	7.4	
			25	53.5	300	250	4.7	8.6	
			32	100	550	460	5.7	10.6	
			40	214	1150	940	6.2	11.5	
			50	480	2550	2070	7	13	
	22 x 58	URGA	25	45	210		4.7	8.5	200 kA @ 660 V
			32	84	400		5.7	10.3	
			40	150	700		7.1	12.8	
			50	270	1270		8.7	15.7	
			63	595	2770		9.8	17.7	
			80	1165	5500		12	21.7	
			100*	2150	9000*		14.2	25.6	600 V

*Operating voltage limited to 600 V for the model with blown fuse trip-indicator / Total clearing I^2t @ 600 V = 9000 A^2s
Minimum operating voltage for built-in trip-indicator: 20 V

Semiconductor Fuses

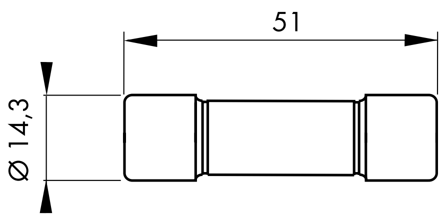
European Fuses

French Ferrule

6.600-6.621 cp URG

REFERENCES

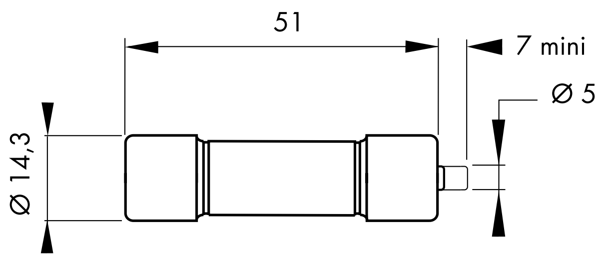
14x51 - Without blown fuse trip-indicator



Weight: 18 g
Packaging: 10 pieces

Current Rating	Catalog Number	Ref. Number
8 A	6 600 CP URGB 14.51/8	T 078033
10 A	6.600 CP URGB 14.51/10	V 078034
12 A	6.600 CP URGB 14.51/12	W 078035
16 A	6.600 CP URGB 14.51/16	X 078036
20 A	6.600 CP URGB 14.51/20	Y 078037
25 A	6.600 CP URGB 14.51/25	Z 078038
32 A	6.600 CP URGB 14.51/32	A 078039
40 A	6.600 CP URGB 14.51/40	B 078040
50 A	6.600 CP URGB 14.51/50	C 078041

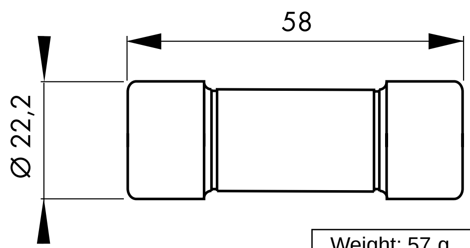
14x51 - With blown fuse trip-indicator



Weight: 18 g
Packaging: 10 pieces

Current Rating	Catalog Number	Ref. Number
8 A	6.621 CP URGB 14.51/8	D 078042
10 A	6.621 CP URGB 14.51/10	E 078043
12 A	6.621 CP URGB 14.51/12	F 078044
16 A	6.621 CP URGB 14.51/16	G 078045
20 A	6.621 CP URGB 14.51/20	H 078046
25 A	6.621 CP URGB 14.51/25	J 078047
32 A	6.621 CP URGB 14.51/32	K 078048
40 A	6.621 CP URGB 14.51/40	L 078049
50 A	6.621 CP URGB 14.51/50	M 078050

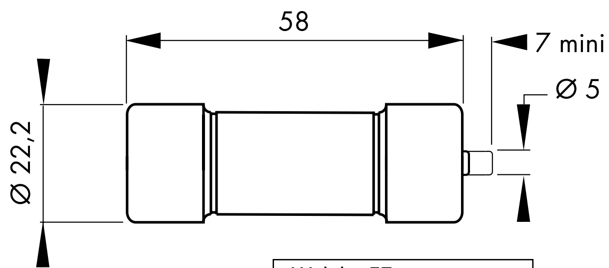
22x58 - Without blown fuse trip-indicator



Weight: 57 g
Packaging: 10 pieces

Current Rating	Catalog Number	Ref. Number
25 A	6.600 CP URGA 22.58/25	C 095245
32 A	6.600 CP URGA 22.58/32	D 095246
40 A	6.600 CP URGA 22.58/40	E 095247
50 A	6.600 CP URGA 22.58/50	F 095248
63 A	6.600 CP URGA 22.58/63	G 095249
80 A	6.600 CP URGA 22.58/80	H 095250
100 A	6.600 CP URGA 22.58/100	N 078051

22x58 - With blown fuse trip-indicator



Weight: 57 g
Packaging: 10 pieces

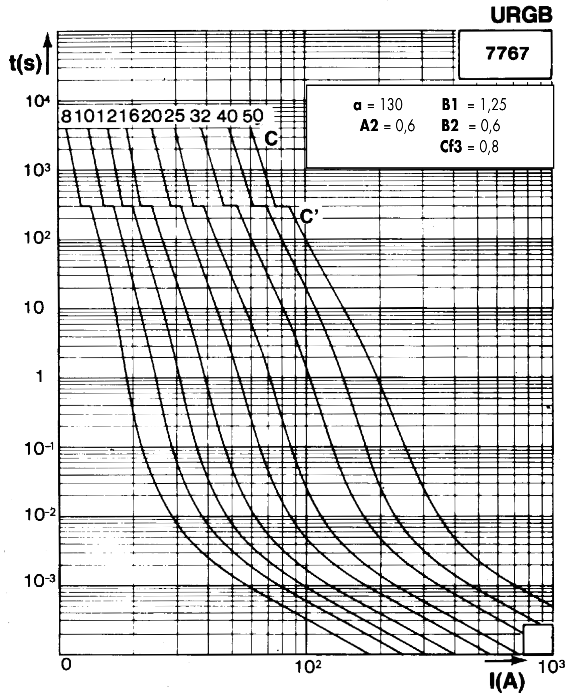
Current Rating	Catalog Number	Ref. Number
25 A	6.621 CP URGA 22.58/25	T 095260
32 A	6.621 CP URGA 22.58/32	V 095261
40 A	6.621 CP URGA 22.58/40	W 095262
50 A	6.621 CP URGA 22.58/50	X 095263
63 A	6.621 CP URGA 22.58/63	Y 095264
80 A	6.621 CP URGA 22.58/80	Z 095265
100 A	621 CP URGA 22.58/100	N 098222

See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

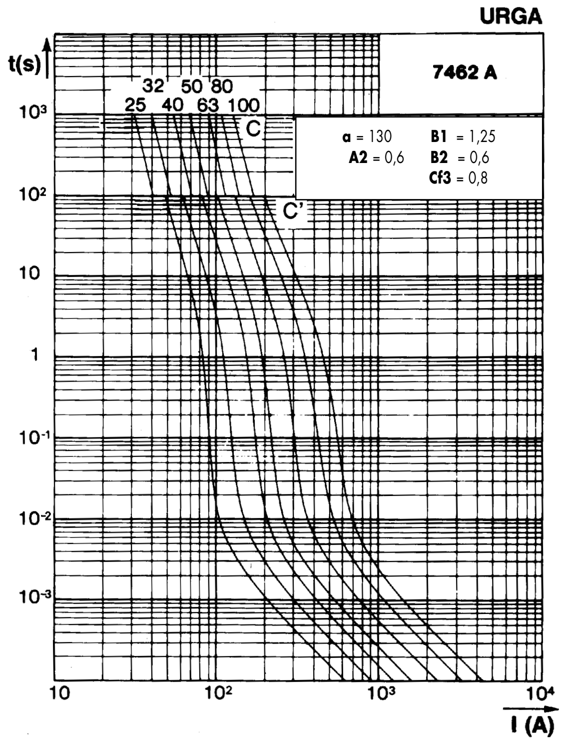
French Ferrule 6.600-6.621 cp URG

ELECTRICAL CHARACTERISTICS

Time vs current characteristics



Tolerance of mean pre-arcing current ± 10%



These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

Tolerance for mean pre-arcing current ± 8%.

French Ferrule

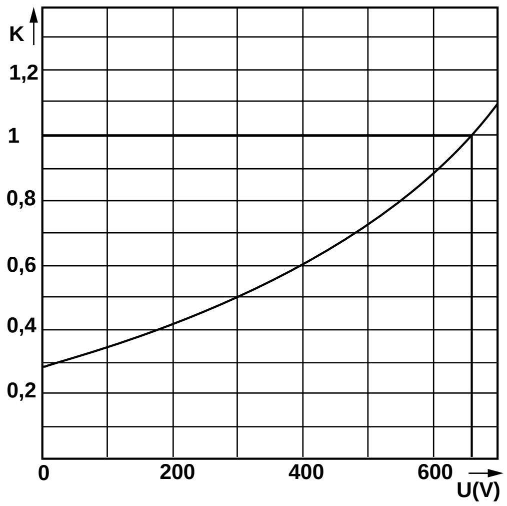
6.600-6.621 cp URG

Corrective factor - Peak arc voltage

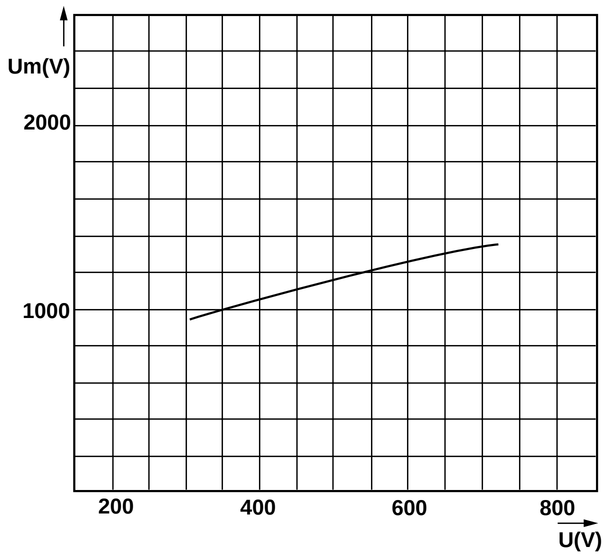
Corrective factor

Peak arc voltage

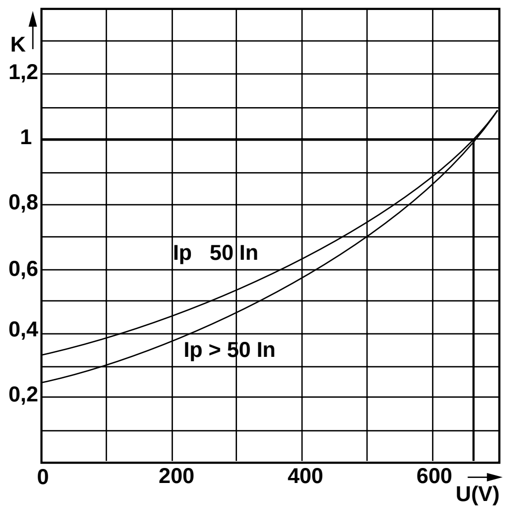
URGB



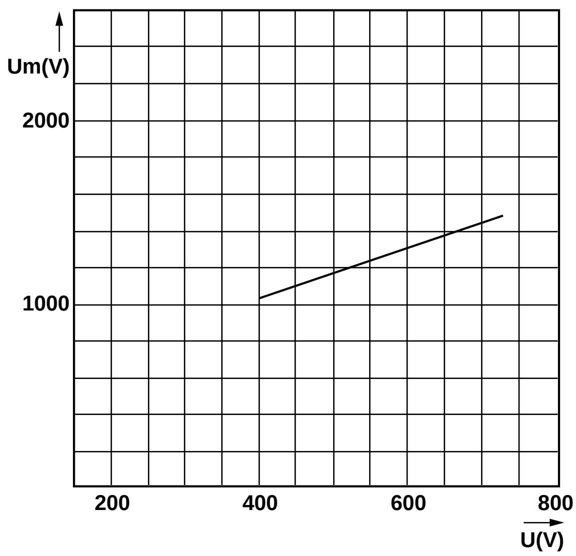
URGB



URGA



URGA



These mean curves show the variation of the total clearing time (I^2t_t) and the total clearing duration t_t as a function of operating voltage U.

This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of operating voltage U @ cos φ = 0.15.

French Ferrule

6.900-6.921 cp gRC-URC

600 - 690 V ~
gRC - URC from1 to 63 A
Size: 14 x 51

- EXTREMELY HIGH INTERRUPTING-RATING FUSES:
  PROTECTION OF SEMICONDUCTORS
  COMPLYING WITH IEC STANDARD 269.1 AND 4
- 690 V VOLTAGE RATING (CURRENT RATING 1 TO 50 A)
  AS PER IEC 33
- gR CLASS (CURRENT RATING 1 TO 50 A) AS PER VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVED SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION AMONG ALL DISTRIBUTION CIRCUIT FUSES
- aR CLASS (CURRENT RATING 63 A) ACCORDING TO VDE 636-23
  AND IEC 269.4
- TWO MODELS AS PER NF C 63210 AND 63211
  WITH OR WITHOUT TRIP-INDICATOR
- gRC fuses are 700VAC-DC UL Recognized c UL us



MAIN CHARACTERISTICS

Voltage rating U_N(V)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating	Estimated interrupting rating
690	gRC	1	0.8/0.31*	3.5/1.4*	0.17	0.35	100k A @ 690 V	300k A @ 690 V
		2	1.5/1*	6.7/4.3*	0.33	0.60		
		4	7.2/6.7*	33/30*	0.77	1.4		
		6	1.4	19	1.3	2.5		
		8	2.4	30	1.5	3.0		
		10	4.3	44	1.75	3.3		
		12	5.4	65	2.25	4.25		
		16	13	110	2.5	4.8		
		20	27	175	2.75	5.25		
		25	53	300	3.0	5.8		
		32	97	550	3.5	7.0		
		40	210	1210	4.5	8.8		
		50	390	2250	5.0	10		
600	URC	63	440	2200	8.0	16	100k A @ 600 V	300k A @ 600 V

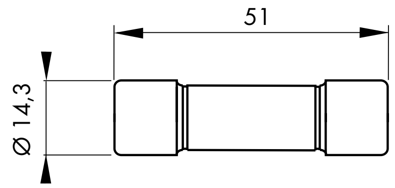
* I^2t values for fuses without trip-indicator.
Minimum operating voltage for the trip-indicator : 20 V

See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

French Ferrule

6.900-6.921 cp gRC-URC

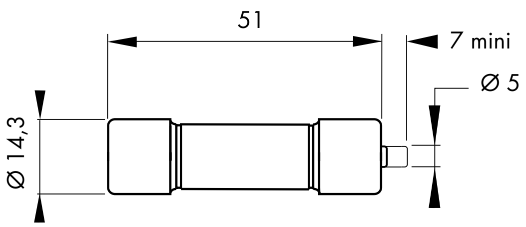
14 X 51 WITHOUT TRIP-INDICATOR



Weight: 18 g
Packaging: 10 pieces

Current rating	Catalog number	Ref. number
1	6,900 Cp gRC 14.51 1	E 221080
2	6,900 Cp gRC 14.51 2	H 081473
4	6,900 Cp gRC 14.51 4	J 081474
6	6,900 Cp gRC 14.51 6	T 220909
8	6,900 Cp gRC 14.51 8	S 220908
10	6,900 Cp gRC 14.51 10	R 220907
12	6,900 Cp gRC 14.51 12	Q 220906
16	6,900 Cp gRC 14.51 16	P 220905
20	6,900 Cp gRC 14.51 20	E 220735
25	6,900 Cp gRC 14.51 25	N 220904
32	6,900 Cp gRC 14.51 32	W 220819
40	6,900 Cp gRC 14.51 40	M 220903
50	6,900 Cp gRC 14.51 50	L 220902

14 X 51 WITH TRIP-INDICATOR

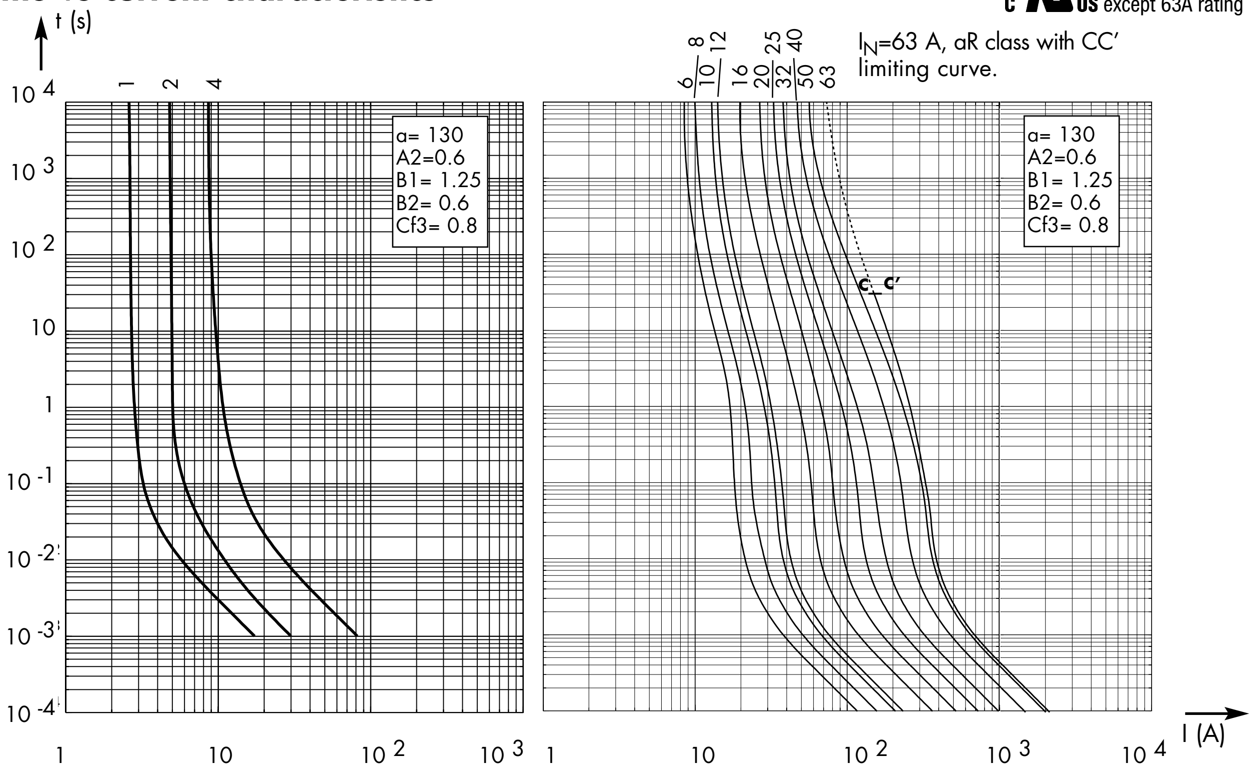


Weight: 18 g
Packaging: 10 pieces

Current rating	Catalog number	Ref. number
1	6,921 Cp gRC 14.51 1	F 221081
2	6,921 Cp gRC 14.51 2	L 081476
4	6,921 Cp gRC 14.51 4	F 081517
6	6,921 Cp gRC 14.51 6	B 220939
8	6,921 Cp gRC 14.51 8	A 220938
10	6,921 Cp gRC 14.51 10	Z 220937
12	6,921 Cp gRC 14.51 12	Y 220936
16	6,921 Cp gRC 14.51 16	X 220935
20	6,921 Cp gRC 14.51 20	W 220934
25	6,921 Cp gRC 14.51 25	V 220933
32	6,921 Cp gRC 14.51 32	V 220818
40	6,921 Cp gRC 14.51 40	M 220949
50	6,921 Cp gRC 14.51 50	N 220950
63	621 Cp URC 14.51 63	V 220910

c UL US except 63A rating

Time vs current characteristics



These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

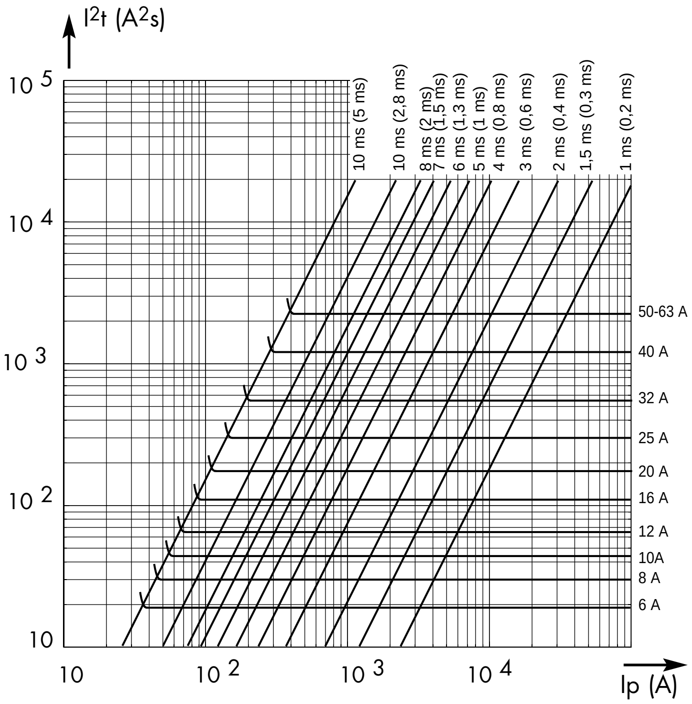
Tolerance for mean pre-arcing current
± 10% for current rating 1, 2, 4 A
± 8% for current rating 6 to 63 A

Ferraz Shawmut

European Fuses

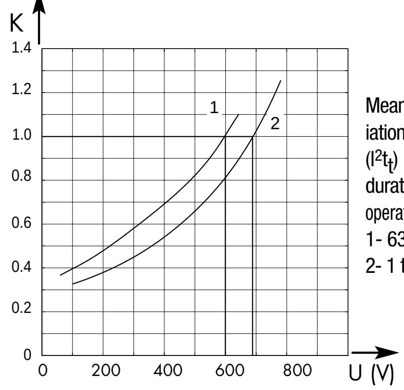
French Ferrule 6.900-6.921 cp gRC-URC

Total clearing I²t



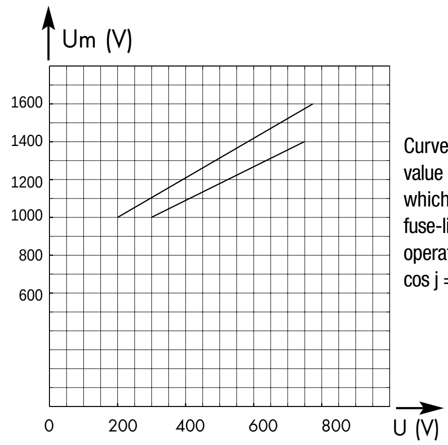
Horizontal curves show maximum values of total clearing I²t (I^2t_t) for each rated current as a function of prospective current Ip @ 690 V. cosφ = 0.15 (for 63 A @ 600 V. cosφ = 0.15).
Oblique lines indicate total clearing duration Tt, with associated pre-arcing duration in brackets.

I²t corrective factor



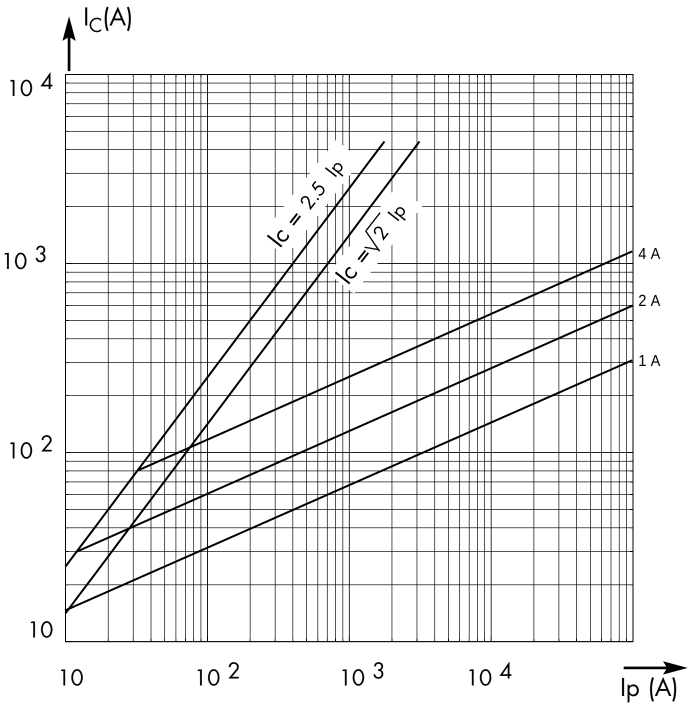
Mean curves showing variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.
1- 63 A rating - 600 V
2- 1 to 50 A rating - 690 V

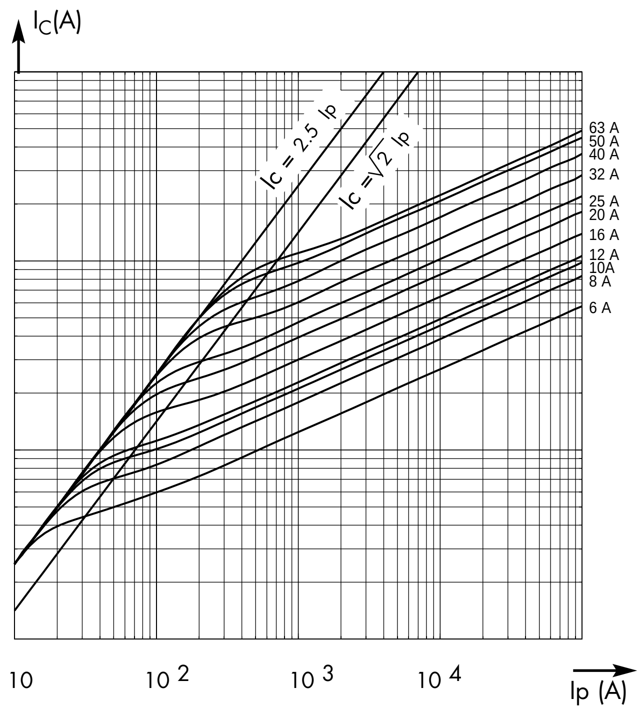
Peak arc voltage



Curves showing peak value Um of arc voltage which appears across fuse-link as a function of operating voltage U @ cos j = 0.15

Current limitation curves

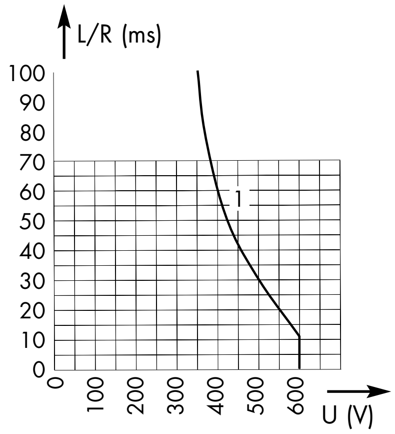


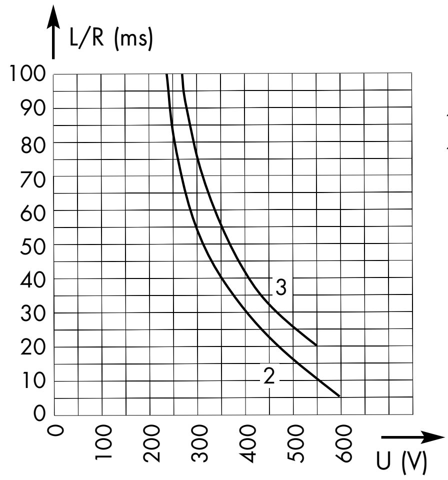


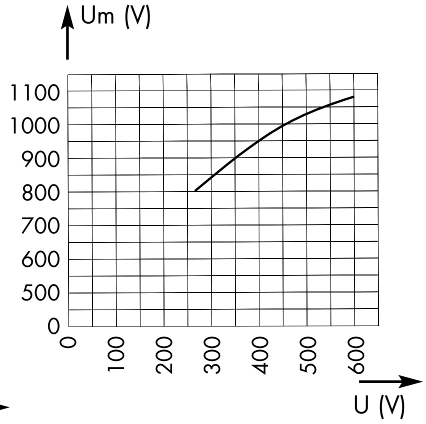
Curves show, for each rating, value of peak let-through current I_C as a function of available fault current Ip.

French Ferrule 6.900-6.921 cp gRC-URC

DC Application data







Above. left and center: Curves indicate the permissible value of time constant L/R as a function of DC working voltage:

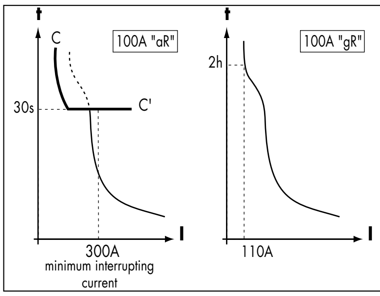
1- For rating 1,2 and 4 A (gRC) Ip 1,6 I_N
2- Ip 1,6 I_N for gRC only (rating 6 to 50 A)
3- Ip 2,5 I_N for gRC and URC (rating 6 to 63 A)

Above, right: Curve indicates peak arc voltage Um which may appear across fuse terminals at working voltage U.

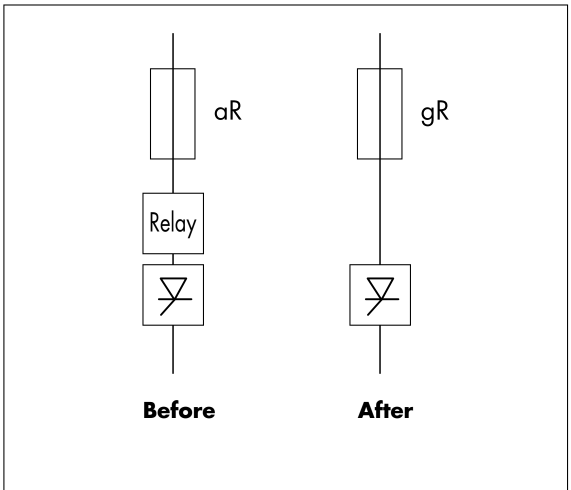
NEW gR-CLASS

OPTIMAL PROTECTION OF POWER EQUIPMENT

Thanks to recent technological developments, Ferraz Shawmut today markets gR-class PROTISTOR® fuses capable of clearing all types of overloads, from low multiples of current ratings up to very high short-circuit currents. Enhanced performance enables these fuses to provide solutions to many previously unsolved problems in power electronics: protection of cables without the use of additional components, protection of equipment from fire hazards, selective coordination of different fuses within a single power distribution installation...



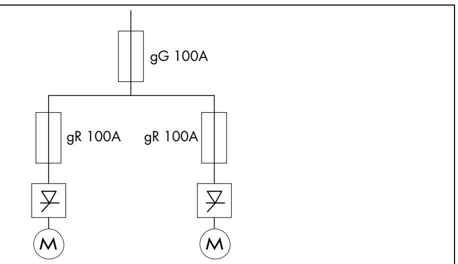
Example: 100A aR vs. 100A gR



SELECTIVE COORDINATION

gR-class semiconductor fuses can be utilized in association with gl and gG-class low voltage power distribution fuses of the same current rating, installed upstream. In a "selectively coordinated" distribution installation, melting is limited to the fuse associated with the faulted circuit, while upstream fuses remain intact. This prevents unnecessary down-time due to power blackouts in non-faulted branches.

Example of selective coordination-



aR-CLASS vs. gR-CLASS

aR-class fuses feature a high minimum interrupting current as compared with their current rating. The primary time-current characteristic of aR-class fuses is the CC' curve, above which another protection device must be associated. The gR-class fuse represents considerably improved performance in semiconductor protection.

FERRAZ SHAWMUT EXPERTISE

gR-class fuses should be used in the design of low voltage equipment and in the protection of power electronics equipment. Designers can often substitute a gR-class fuse for an aR-class fuse (10x38, 14x51, 22x58, PSC 000 and 17x49 DIN80 or BS 88-4) but the reverse is not true: an aR fuse can never replace a gR fuse. Start protecting your new equipment with gR-class fuses today. The application of gR class fuses, with current ratings less than 100 Amps, offers enhanced protection, safety and reliability, along with reduced risk of replacement errors and assembly costs.

Semiconductor Fuses

European Fuses

French Ferrule 6.900-6.921 cp gRC-URD

600 - 690 V ~
gRC - URD from 20 to 135 A
Size: 22 x 58

- EXTREMELY HIGH INTERRUPTING RATING FUSES:
  PROTECTION OF SEMICONDUCTORS
  IN COMPLIANCE WITH IEC STANDARD 269.1 AND 4
- 690 V VOLTAGE RATING (CURRENT RATING 20 TO 100 A)
  AS PER IEC 33
- gR CLASS (CURRENT RATING 20 TO 100 A) ACCORDING TO
  VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVED SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION AMONG ALL
    DISTRIBUTION CIRCUIT FUSES
- aR CLASS (CURRENT RATING 125 AND 135 A) AS PER VDE 636-23
  AND IEC 269.4
- TWO MODELS COMPLYING WITH NF C 63210 AND 63211
  WITH OR WITHOUT TRIP-INDICATOR
- gRC FUSES ARE 700VAC-DC UL RECOGNIZED c UL us



MAIN CHARACTERISTICS

Voltage rating U_N(V)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss		Tested interrupting rating	Estimated interrupting rating
					0.8 I_N	I_N		
690	gRC	20	17	125	4.0	6.5	100k A @ 690 V	300k A @ 690 V
		25	39	280	4.5	7.5		
		32	72	490	5.0	9.0		
		40	118	785	5.5	10		
		50	242	1390	7.0	11.5		
		63	430	2460	8.0	13.5		
		80	970	5565	9.0	15.5		
		100	2080	11950	10	17		
600	URD	125	2900	14000	14	22	100k A @ 600 V	300k A @ 600 V
		135	3360	17700	15	25		

Minimum operating voltage for the trip-indicator: 20 V

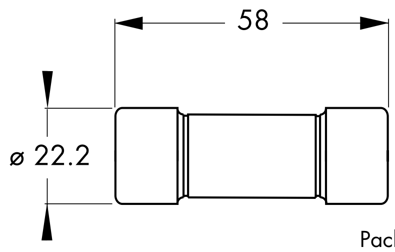
See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

Semiconductor Fuses

European Fuses

French Ferrule 6.900-6.921 cp gRC-URD

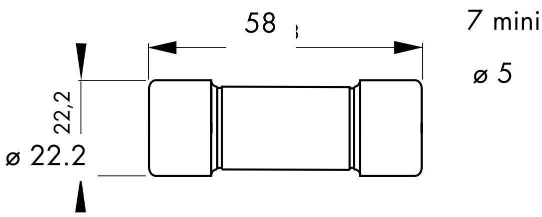
22 X 58 WITHOUT TRIP-INDICATOR



Weight: 57 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
20	6,900 CP gRC 22.58 20	C 220940
25	6,900 CP gRC 22.58 25	B 220916
32	6,900 CP gRC 22.58 32	A 220915
40	6,900 CP gRC 22.58 40	Z 220914
50	6,900 CP gRC 22.58 50	Y 220913
63	6,900 CP gRC 22.58 63	X 220912
80	6,900 CP gRC 22.58 80	Y 220821
100	6,900 CP gRC 22.58 100	W 220911

22 X 58 WITH TRIP-INDICATOR



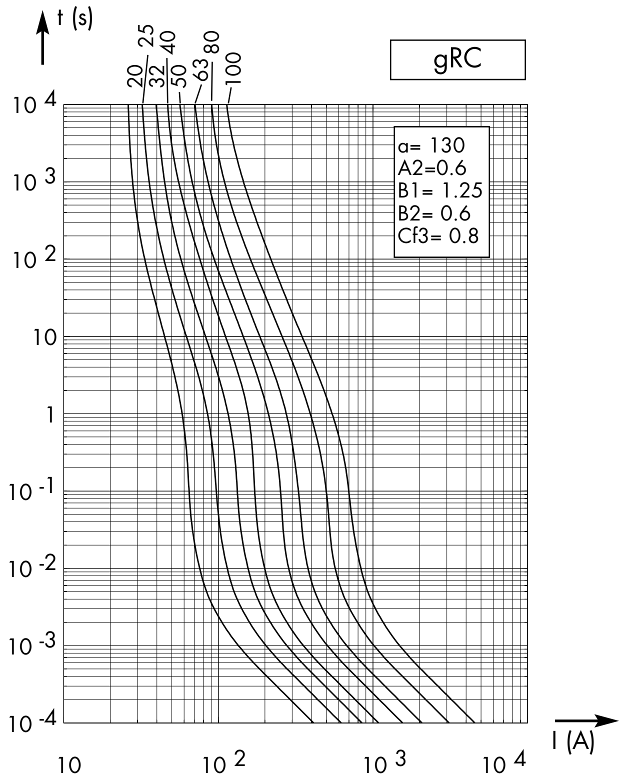
Weight: 57 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
20	6,921 CP gRC 22.58 20	D 220734
25	6,921 CP gRC 22.58 25	G 220921
32	6,921 CP gRC 22.58 32	F 220920
40	6,921 CP gRC 22.58 40	E 220919
50	6,921 CP gRC 22.58 50	D 220918
63	6,921 CP gRC 22.58 63	C 220733
80	6,921 CP gRC 22.58 80	X 220820
100	6,921 CP gRC 22.58 100	C 220917
125	621 CP URD 22.58 125	A 220708
135	621 CP URD 22.58 135	B 220709

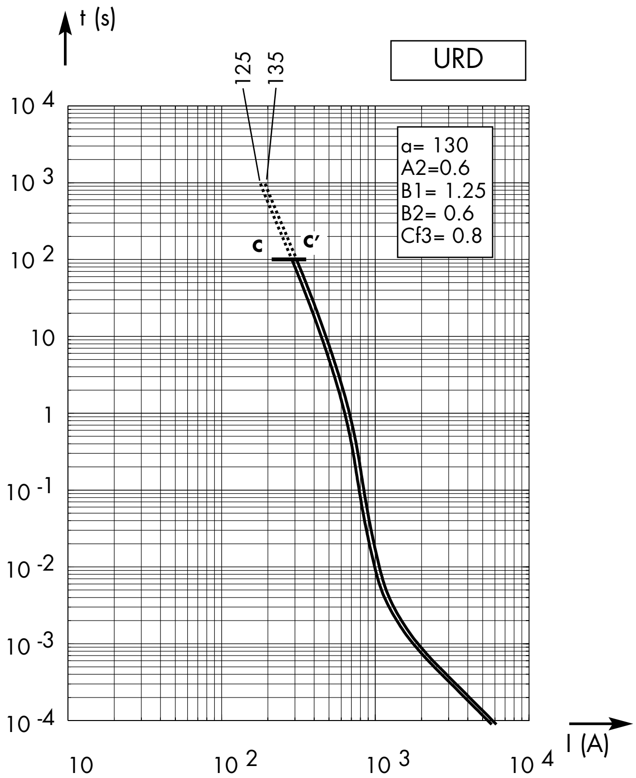
c US except 125 and 135A rating

ELECTRICAL CHARACTERISTICS

Time vs current characteristics



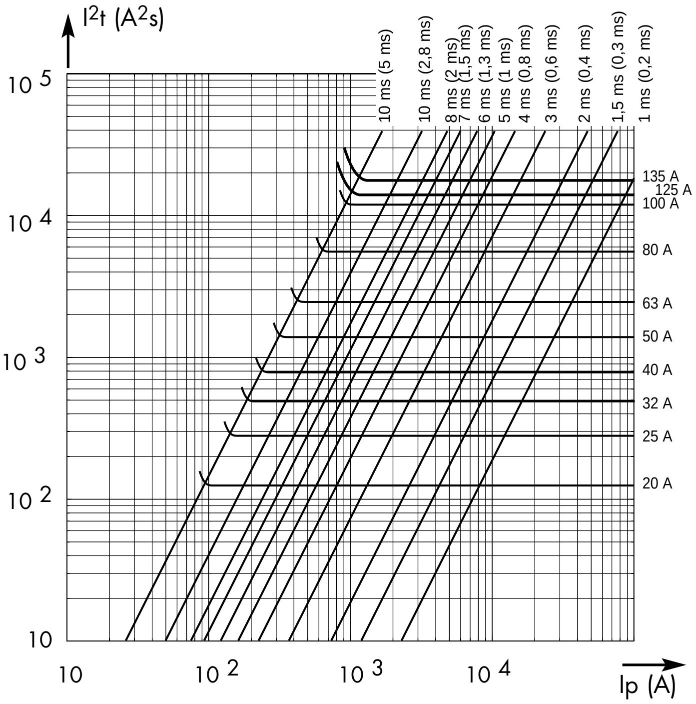
These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current



Tolerance for mean pre-arcing current
± 9% for all current ratings

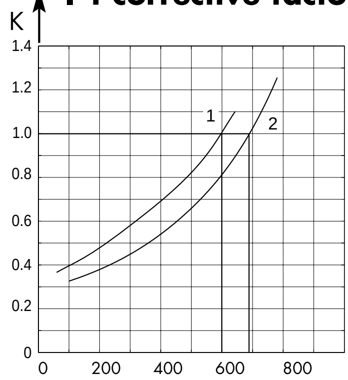
French Ferrule 6.900-6.921 cp gRC-URD

Total clearing I^2t



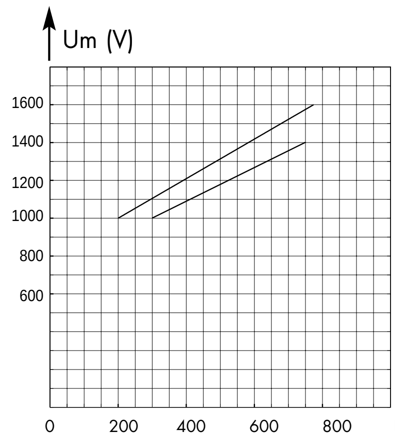
Above: Horizontal curves show, for each rated current, maximum values of total clearing I^2t (I^2t_t) as a function of prospective current Ip @ 690 V. cosφ = 0.15 (125-135 A @ 600 V.cosφ = 0.15)
Oblique lines indicate total clearing duration Tt with associated pre-arcing duration in brackets.

I^2t corrective factor



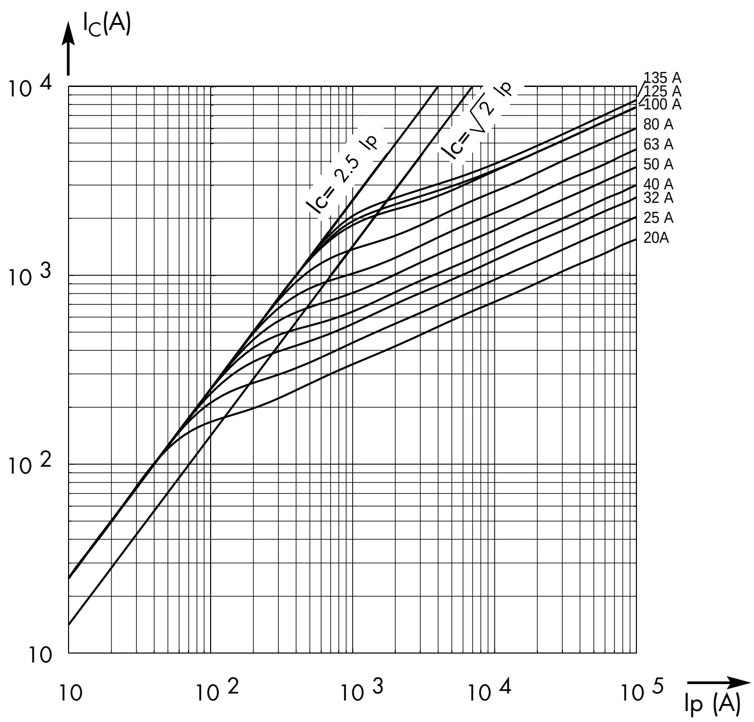
Mean curves showing variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.
1- 125 and 135 A rating
2- 20 to100 A rating

Peak arc voltage



Curve showing peak value Um of arc voltage which appears across fuse-link as a function of operating voltage U @ cos j = 0.15

Current limitation curves



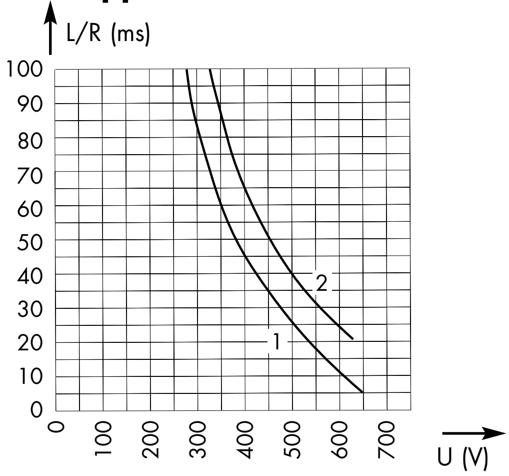
Left: Curves show value of peak let-through current I_C as a function of the available fault current Ip.

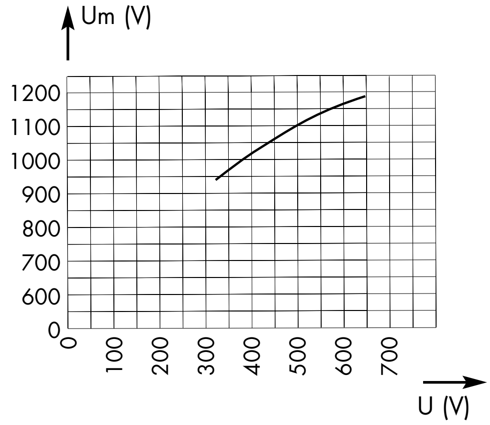
Semiconductor Fuses

European Fuses

French Ferrule   6.900-6.921 cp gRC-URD

DC Application data



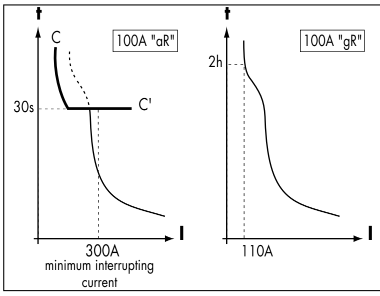


Above: Curve indicates peak arc voltage Um which may appear across fuse terminals at working voltage U.

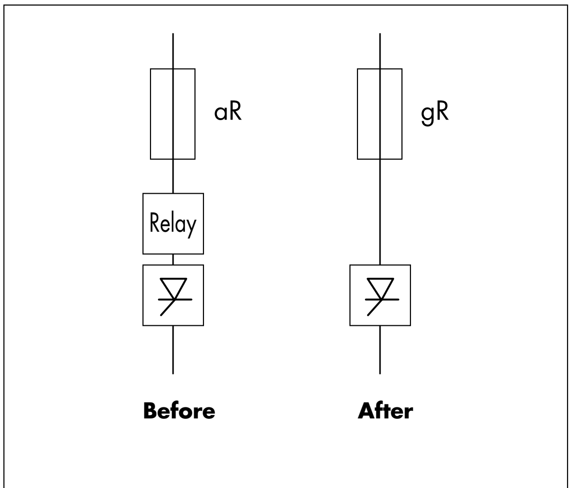
NEW gR-CLASS

OPTIMAL PROTECTION OF POWER EQUIPMENT

Thanks to recent technological developments, Ferraz Shawmut today markets gR-class PROTISTOR® fuses capable of clearing all types of overloads, from low multiples of current ratings up to very high short-circuit currents. Enhanced performance enables these fuses to provide solutions to many previously unsolved problems in power electronics: protection of cables without the use of additional components, protection of equipment from fire hazards, selective coordination of different fuses within a single power distribution installation...



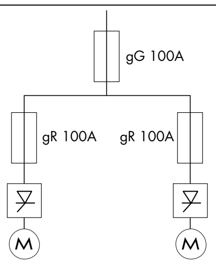
Example:
100A aR vs. 100A gR



SELECTIVE COORDINATION

gR-class semiconductor fuses can be utilized in association with gI and gG-class low voltage power distribution fuses of the same current rating, installed upstream. In a "selectively coordinated" distribution installation, melting is limited to the fuse associated with the faulted circuit, while upstream fuses remain intact. This prevents unnecessary down-time due to power blackouts in non-faulted branches.

Example of selective coordination-



aR-CLASS vs. gR-CLASS

aR-class fuses feature a high minimum interrupting current as compared with their current rating. The primary time-current characteristic of aR-class fuses is the CC' curve, above which another protection device must be associated. The gR-class fuse represents considerably improved performance in semiconductor protection.

FERRAZ SHAWMUT EXPERTISE

gR-class fuses should be used in the design of low voltage equipment and in the protection of power electronics equipment. Designers can often substitute a gR-class fuse for an aR-class fuse (10x38, 14x51, 22x58, PSC 000 and 17x49 DIN80 or BS 88-4) but the reverse is not true: an aR fuse can never replace a gR fuse. Start protecting your new equipment with gR-class fuses today. The application of gR class fuses, with current ratings less than 100 Amps, offers enhanced protection, safety and reliability, along with reduced risk of replacement errors and assembly costs.

Ferraz Shawmut

French Ferrule — 621-6.621cp URGD

600 V - 660 V AC
URGD - from 63 up to 250A
Size: 27x60

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS ACCORDING TO IEC STANDARD 269.1 AND 4
- 600 V - 660 V AC VOLTAGE RATING
- aR- CLASS ACCORDING TO VDE 636-23 AND IEC 269.4



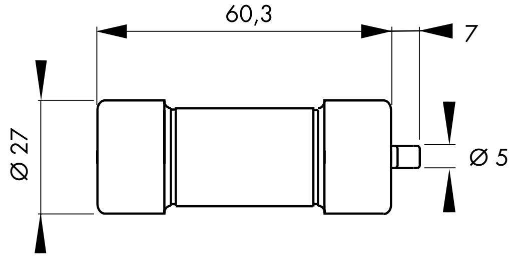
MAIN CHARACTERISTICS

Voltage rating U_N(VAC)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ U_N I^2t_t (A^2s)	Watts loss		Tested interrupting rating
					0.8 I_N	I_N	
660 V	URGD	63	405	1840	12	22	200 kA @ 660 V
		80	860	3750	13.5	24.6	
		100	1620	6800	15	27	
		125	3425	13600	16	29.5	
		160	6480	24600	17	32.5	
		200	13700	61500	18.5	35.7	
600 V	URGD	250	29600	107000	21	40	200 kA @ 600 V

Minimum operating voltage for trip-indicator: 20 V

Ref. Numbers

27x60 - With blown fuse trip-indicatior



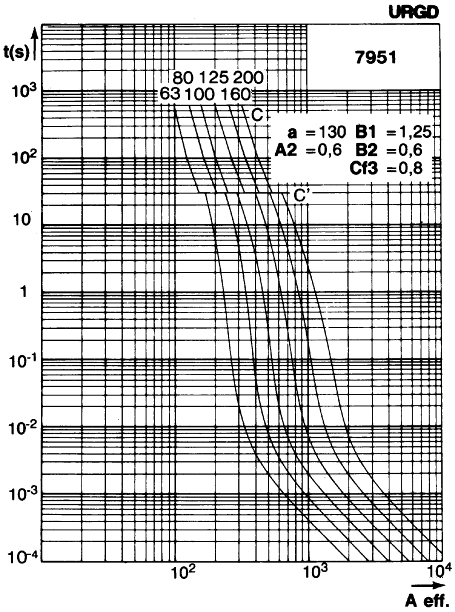
Type	Voltage	Current rating	Catalog Number	Ref. Number
URGD	660 V	63 A	6.621 CP URGD 27x60/ 63	A076820
		80 A	6.621 CP URGD 27x60/ 80	B076821
		100 A	6.621 CP URGD 27x60/100	C076822
		125 A	6.621 CP URGD 27x60/125	D076823
		160 A	6.621 CP URGD 27x60/160	E076824
		200 A	6.621 CP URGD 27x60/200	F076825
URGD	600 V	250 A	621 CP URGD 27x60/250	W076264

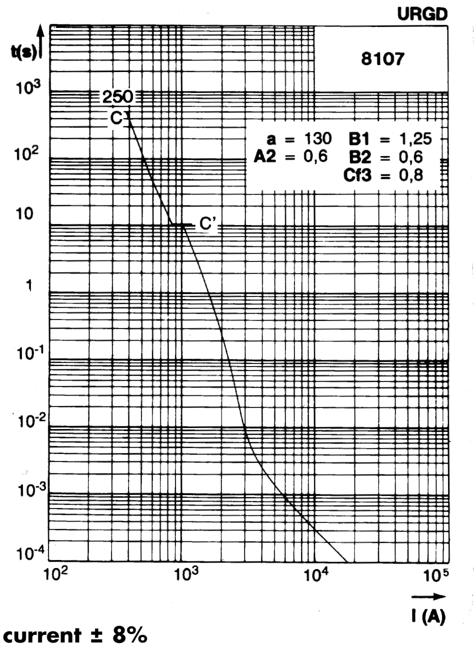
See Fuse Blocks and Fuse Holders section and Medium Voltage Fuse Clips

European Fuses

French Ferrule 621-6.621cp URGD

Time vs current characteristics

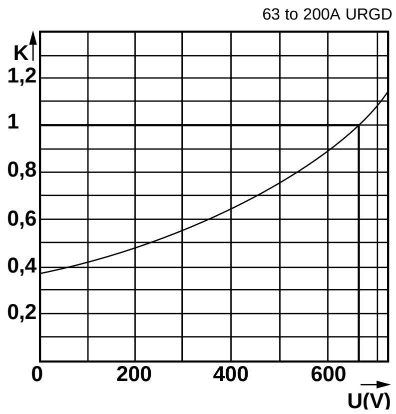


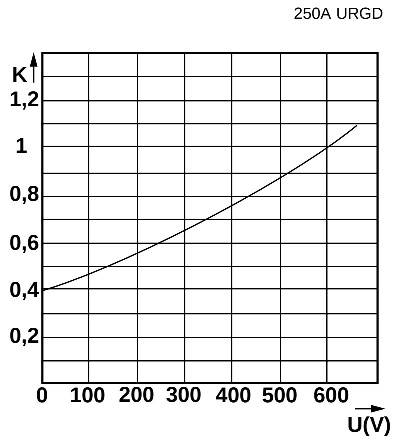


Tolerance for mean pre-arcing current ± 8%

These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

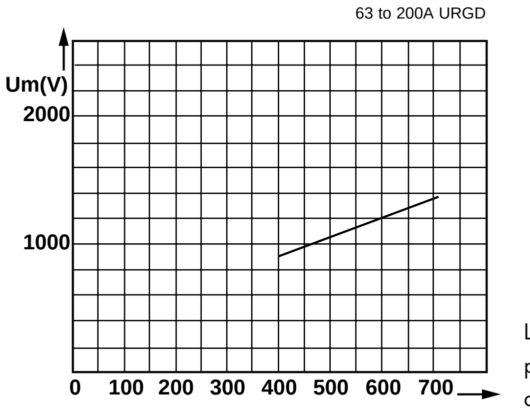
Corrective factor

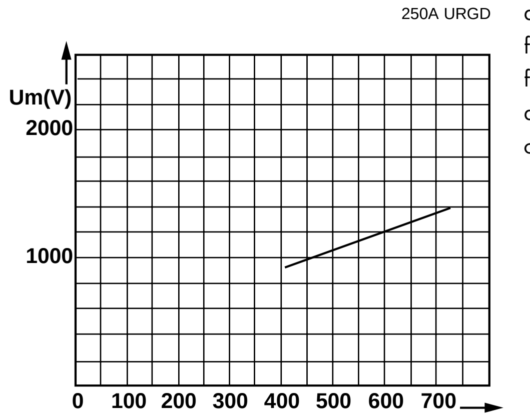




Left: Mean curves showing variation of total clearing time (I^2t_t) and the total clearing duration t_t as a function of the operating voltage U.

Peak arc voltage





Left: Curves show peak value Um of arc voltage which appears across the fuse-link as a function of operating voltage U @ cos φ = 0.15.

French Ferrule 6.621cp URQ URS - 1021cp URQ

660 V - 1000 V AC
URB - URQ - URS from 32 to 250 A
Size: 27x60

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMI CONDUCTORS ACCORDING TO IEC STANDARD 269.1 AND 4
- 660 V - 1000 V AC VOLTAGE RATING
- aR-CLASS ACCORDING TO VDE 636-23 AND IEC 269.4
- 660V URQ and 1000V URB are UL RECOGNIZED



MAIN CHARACTERISTICS

Voltage rating U_N(VAC)	Class	Current rating I_N (A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ U_N I^2t_t (A^2s)	Watts loss 0,8 I_N	Watts loss I_N	Tested interrupting rating
660 V	URQ	50	110	610	8.4	16	200 kA @ 660 V
		63	155	860	11.1	21	
		80	350	1880	12.6	24	
		100	625	3210	14.2	27	
		125	1400	6970	15.7	30	
		160	3150	15000	17.7	34	
		200	6580	30000	19.4	38	
		250	15570	63000	22.6	45	
	URS	125	2790	13000	14.5	25	
		160	5500	24000	17.5	30	
1000 V	URB	32	33	250	7.4	14.5	100 kA @ 1000 V
		40	60	450	8.7	17	
		50	110	840	9.7	19	
		63	200	1470	11.3	22	
		80	435	3300	12.3	24	
		100	975	6000	14	27	
		125	1910	12500	16	31	
		160	3890	26700	18	35	
		170	4710	36000	19	37	

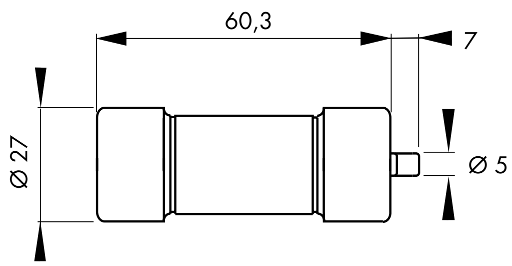
* Minimum operating voltage for trip-indicator: 20 V

European Fuses

French Ferrule 6.621cp URQ-URS - 1021cp URB

Except 125 and 160A URS

27x60 - With blown fuse trip-indicatior



Type	Voltage	Current rating	Catalog Number	Ref. Number
URQ	660 V	50 A	6.621 CP URQ 27x60/ 50	N075958
		63 A	6.621 CP URQ 27x60/ 63	V076309
		80 A	6.621 CP URQ 27x60/ 80	W076310
		100 A	6.621 CP URQ 27x60/100	R078330
		125 A	6.621 CP URQ 27x60/125	S078331
		160 A	6.621 CP URQ 27x60/160	X076311
		200 A	6.621 CP URQ 27x60/200	T078332
		250 A	6.621 CP URQ 27x60/250	T076308
URS	660 V	125 A	6.621 CP URS 27x60/125	P209865
		160 A	6.621 CP URS 27x60/160	Q209866
URB	1000 V	32 A	1021 CP URB 27x60/ 32	S081298
		40 A	1021 CP URB 27x60/ 40	R081297
		50 A	1021 CP URB 27x60/ 50	Q081296
		63 A	1021 CP URB 27x60/ 63	P081295
		80 A	1021 CP URB 27x60/ 80	N081294
		100 A	1021 CP URB 27x60/100	M081293
		125 A	1021 CP URB 27x60/125	L081292
		160 A	1021 CP URB 27x60/160	K081291
		170 A	1021 CP URB 27x60/170	Z080338

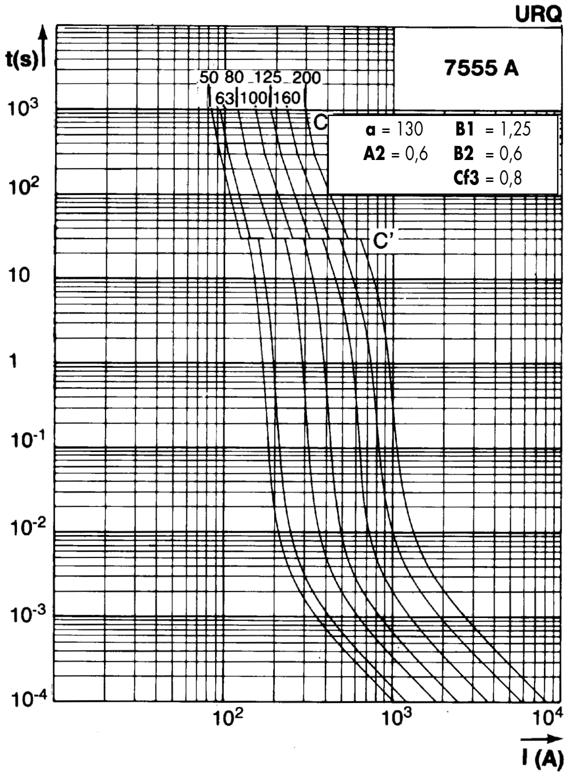
See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

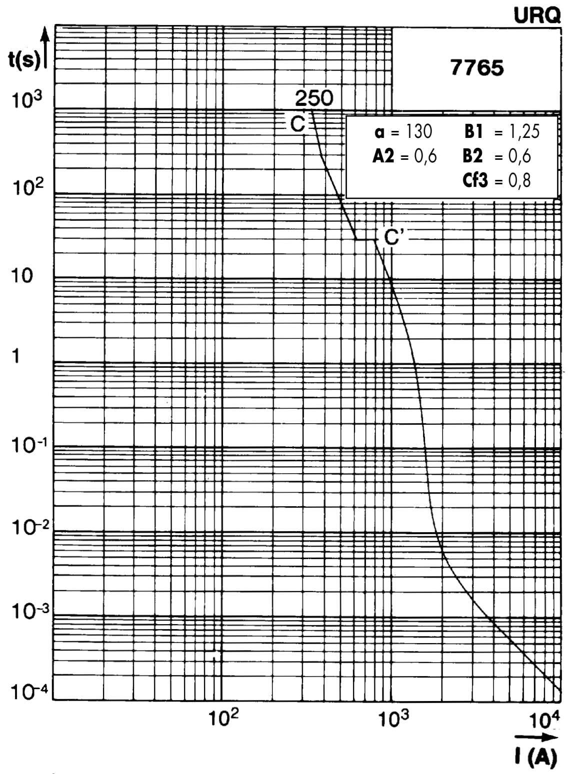
Semiconductor Fuses

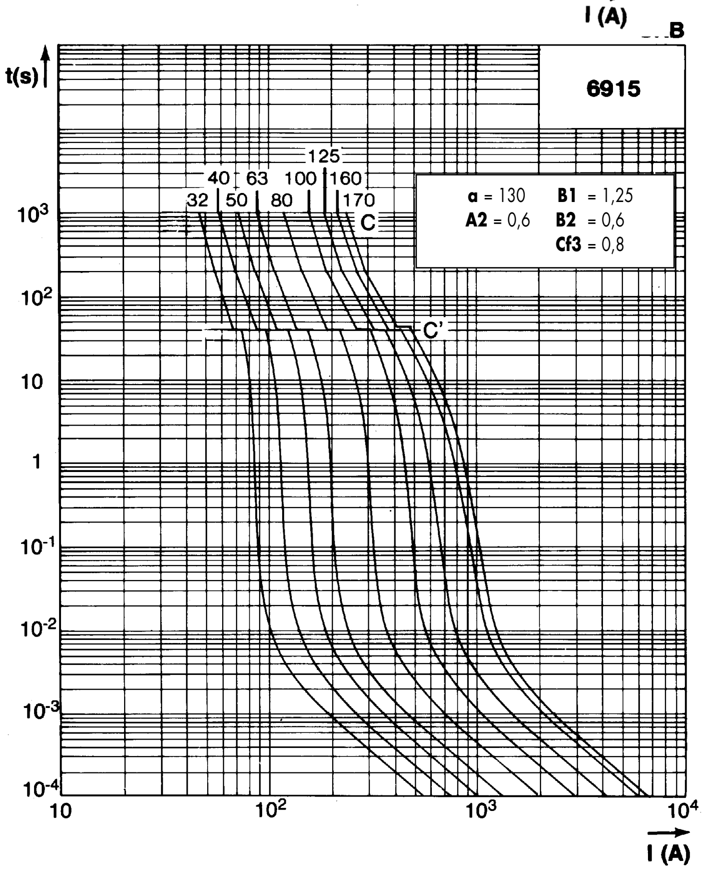
European Fuses

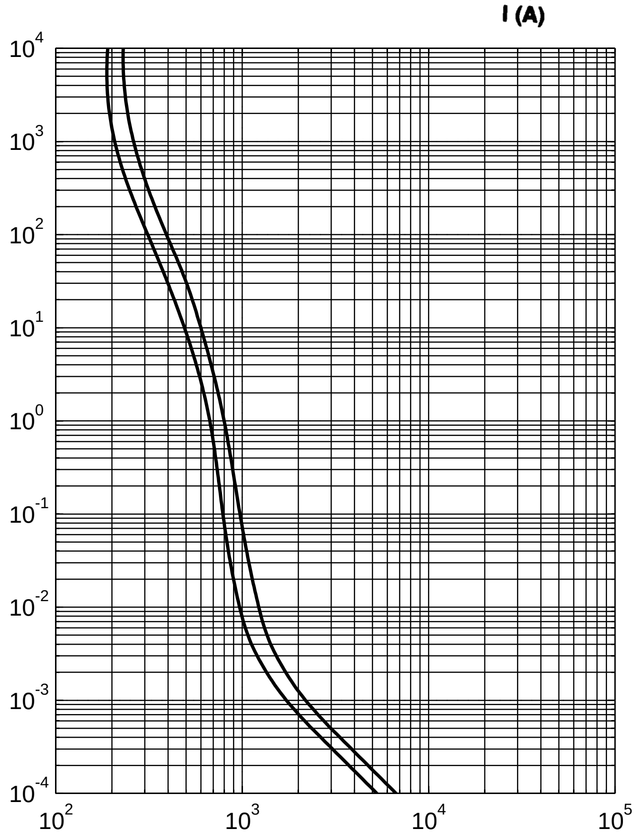
French Ferrule 6.621cp URQ - 1021cp URB

Time vs current characteristics









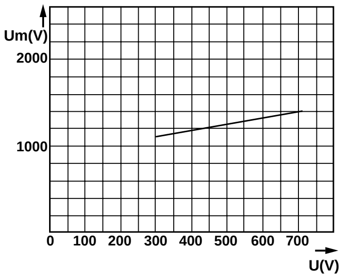
These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

Tolerance for mean pre-arcing current ± 8%.

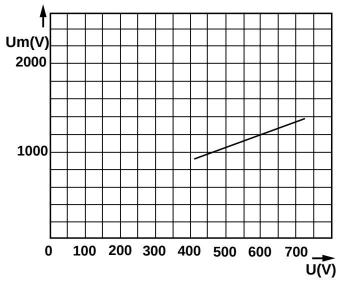
French Ferrule 6.621cp URQ - 1021cp URB

Peak arc voltage

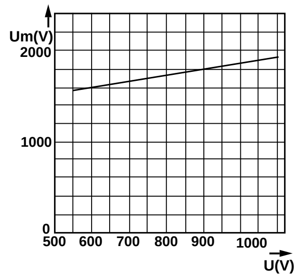
50 to 200 A URQ



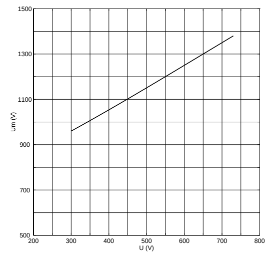
250 A URQ



32 to170 A URB



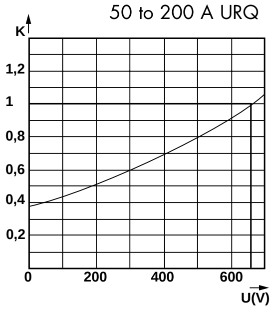
125-160A URS



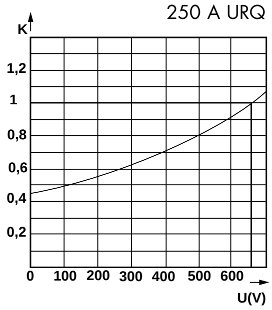
These curves show peak value Um of arc voltage which appears across the fuse-link as a function of operating voltage U @ cos φ = 0.15.

Corrective factor

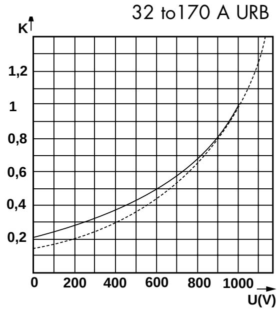
50 to 200 A URQ



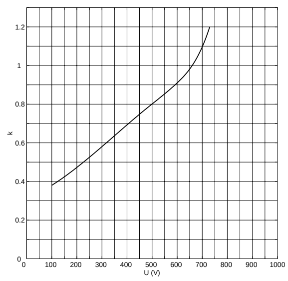
250 A URQ



32 to170 A URB

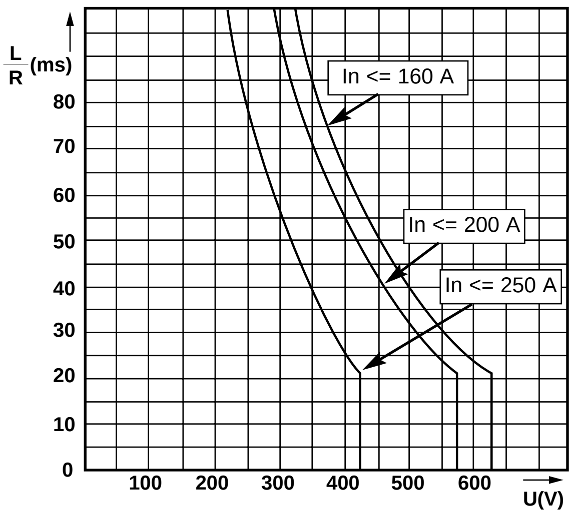


125-160A URS



Above: Mean curves show variation of total clearing time (I^2t_t) and total clearing duration t_t as a function of operating voltage U.

DC Application data



Left: Curves indicate permissible value of time constant L/R as a function of the DC working voltage

Semiconductor Fuses

European Fuses

French Ferrule — 821cp gRB

800 V ~
gRB from 8 to 110 A
Size: 27 x 60

- EXTREMELY HIGH INTERRUPTING RATING FUSES:
  PROTECTION OF POWER SEMICONDUCTORS
  COMPLYING WITH IEC STANDARDS 269-1 AND 4

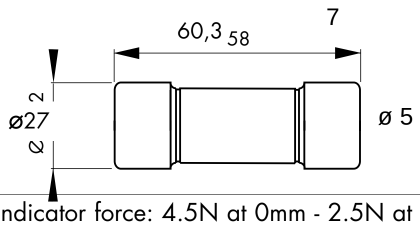
- 800 V VOLTAGE RATING ACCORDING TO IEC 33

- gR CLASS AS PER IEC 269-4
  - CLEARING ALL OVERLOADS
  - IMPROVED SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION WITH OTHER FUSES



- WITH BUILT-IN BLOWN TRIP INDICATOR

DIMENSIONS



Unit weight
78 g

Trip indicator force: 4.5N at 0mm - 2.5N at 7mm

MAIN CHARACTERISTICS

Voltage rating U_N(V)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating	Catalog Number	Ref. Number	Pack
		8	4.25	70	1.2	2.0		821 CP GRB27.60 8	R221436	10
		10	8.0	100	1.3	2.3		821 CP GRB27.60 10	S221437	10
		12	17.0	180	1.4	2.5		821 CP GRB27.60 12	T221438	10
		16	26.5	250	1.9	3.5	175 k A	821 CP GRB27.60 16	V221439	10
		20	38.5	350	2.4	4.0	@700V	821 CP GRB27.60 20	W221440	10
		25	73.0	600	2.8	5.0		821 CP GRB27.60 25	X221441	10
800	gRB	32	130	1000	3.5	6.0		821 CP GRB27.60 32	Y221442	10
		40	195	1400	4.7	8.0		821 CP GRB27.60 40	Z221443	10
		50	430	2700	4.8	8.5	90 kA	821 CP GRB27.60 50	A221444	10
		63	965	5500	5.6	10	@800V	821 CP GRB27.60 63	B221445	10
		80	1890	11000	6.4	11.5		821 CP GRB27.60 80	C221446	10
		100	3480	19000	7.4	13		821 CP GRB27.60 100	D221447	10
		110	4670	27000	7.7	14		821 CP GRB27.60 110	E221448	10

Minimum operating voltage for trip-indicator: 20 V

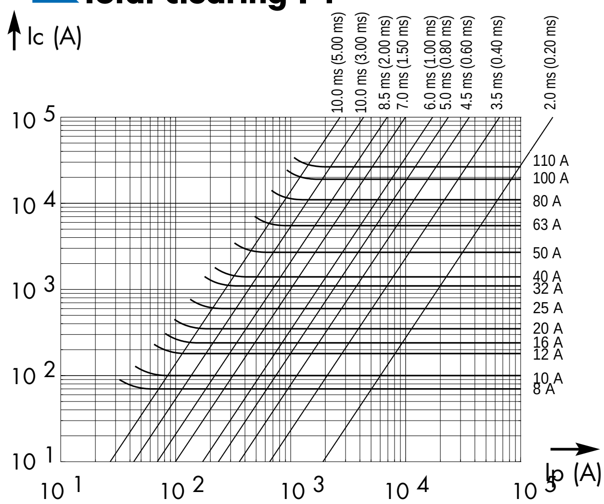
See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

Semiconductor Fuses

European Fuses

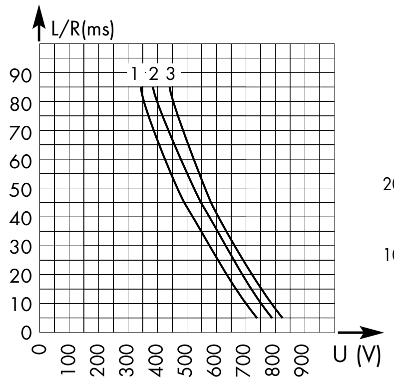
French Ferrule — 821cp gRB

Total clearing I²t

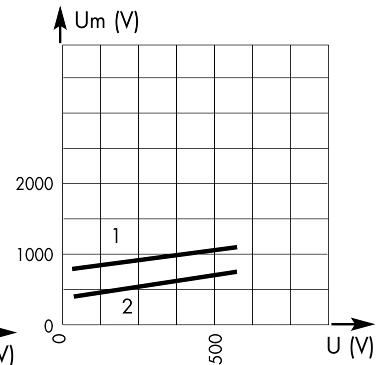


Above: Horizontal curves show maximum values of total clearing I^2t (I^2t_t) as function of prospective current Ip. @ U_N.with cosj = 0.15. Oblique lines indicate total clearing duration Tt and associated pre-arcing duration in brackets.

DC Application data



Above: Curves indicate permissible value of time constant L/R as a function of DC working voltage.
1 - I_N from 80 to 110 A / **2** - I_N from 25 to 63 A
3 - I_N from 8 to 12 A

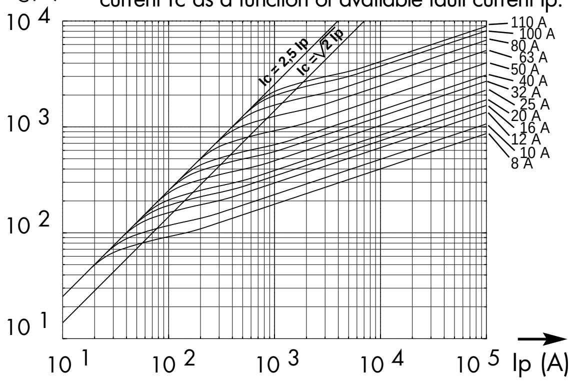


1 - L/R = 60 ms / **2** - L/R = 30 ms

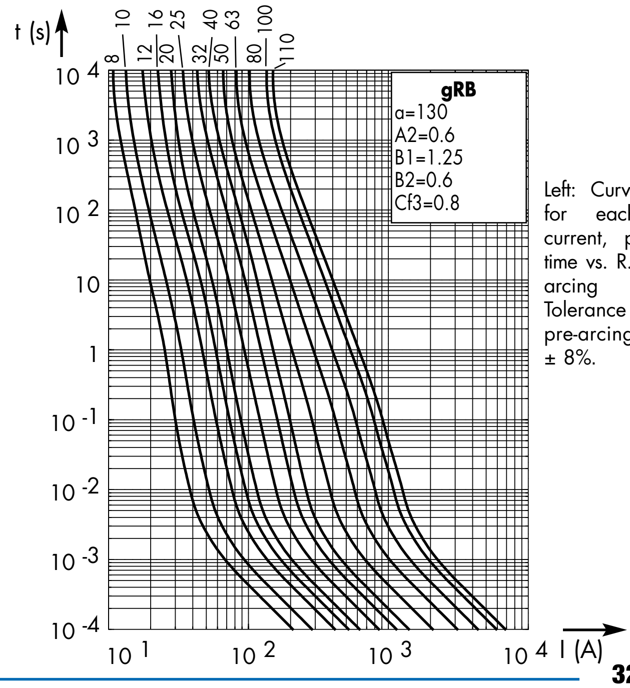
Above: Curve indicates peak arc voltage Um which may appear across fuse terminals at working voltage U, for different values of time constant L/R of the fault circuit.

Current limitation curves

Below: Curves show, for each rating, value of peak let-through current Ic as a function of available fault current Ip.

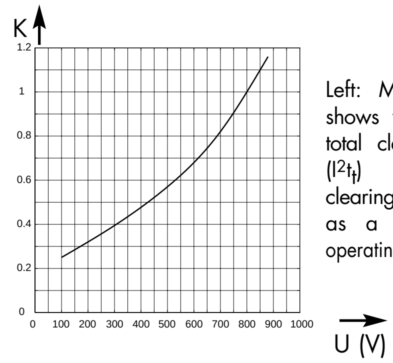


Time vs current characteristics



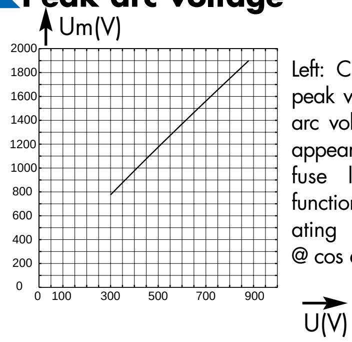
Left: Curves show, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current. Tolerance for mean pre-arcing current ± 8%.

I²t corrective factor



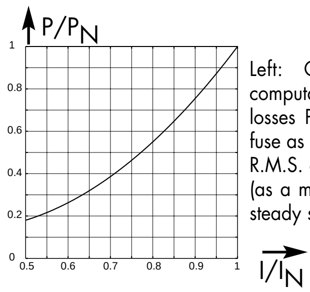
Left: Mean curve shows variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.

Peak arc voltage



Left: Curve shows peak value Um of arc voltage which appears across the fuse link as a function of operating voltage U @ cos φ = 0.15

Watts loss



Left: Curve enables computation of power losses P for a I_N-rated fuse as a function of the R.M.S. current I (as a multiple of I_N for steady state operation)

Publication: X 600550-07/98
CP3P1 / 3P1 31023 GB
RA 0388A

DIN Fuses 6,9 gRB-URB

690 V ~
gRB - URB from 12 to 100 A
Size: 17 x 49

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 690 V VOLTAGE RATING AS PER IEC 33
- gR CLASS (CURRENT RATING 12 TO 90 A) AS PER VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVED SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION WITH ALL FUSES WITHIN DISTRIBUTION CIRCUIT
- aR CLASS (CURRENT RATING 100 A) ACCORDING TO VDE 636-23 AND IEC 269.4
- CONNECTION AS PER:
  - GERMAN STANDARD DIN 43653/00C
  - BRITISH STANDARD BS 88-4
- These fuses are UL Recognized c UL us



MAIN CHARACTERISTICS

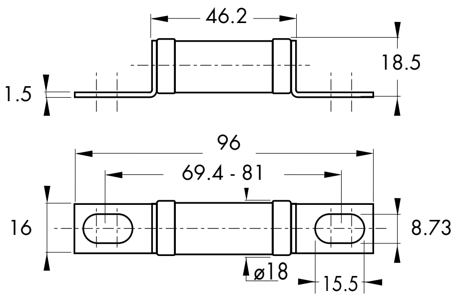
Voltage rating U_N(V)	Class	Current rating I_N(A)	pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating	Estimated interrupting rating
690	gRB	12 16 20 25 32 35 40 45 50 55 63 75 80 90	4.2 9.6 17.1 26.8 52.5 69 96 130 154 210 310 520 620 840	30 65 110 170 330 430 610 820 970 1320 1950 3250 3900 5300	1.95 2.2 3.0 4.4 5.0 5.2 5.8 6.3 7.2 7.4 8.0 8.8 9.4 11	3.5 4.0 5.5 8.0 9.0 9.5 10.5 11.5 13 13.5 14.5 16 17 20	200 k A @ 690 V	300 k A @ 690 V
690	URB	100	965	6150	13	23.5	200 k A @ 690 V	300 k A @ 690 V

Minimum operating voltage for separate trip-indicator: 20 V

DIN Fuses

6,9 gRB-URB

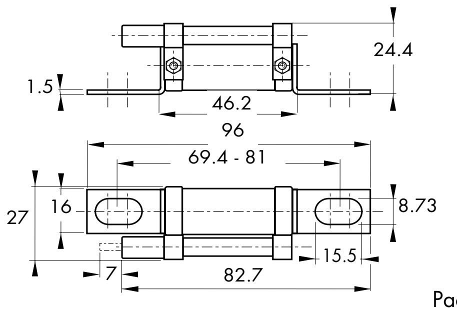
GERMAN STANDARD WITHOUT BLOWN FUSE INDICATION



Weight: 40 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
12	6,9 gRB 17 D08/12	M220972
16	6,9 gRB 17 D08/16	N220973
20	6,9 gRB 17 D08/20	P220974
25	6,9 gRB 17 D08/25	Q220975
32	6,9 gRB 17 D08/32	R220976
35	6,9 gRB 17 D08/35	S220977
40	6,9 gRB 17 D08/40	T220978
45	6,9 gRB 17 D08/45	V220979
50	6,9 gRB 17 D08/50	W220980
55	6,9 gRB 17 D08/55	X220981
63	6,9 gRB 17 D08/63	Y220982
75	6,9 gRB 17 D08/75	Z220983
80	6,9 gRB 17 D08/80	A220984
90	6,9 gRB 17 D08/90	B220985
100	6,9 URB 17 D08/100	C220986

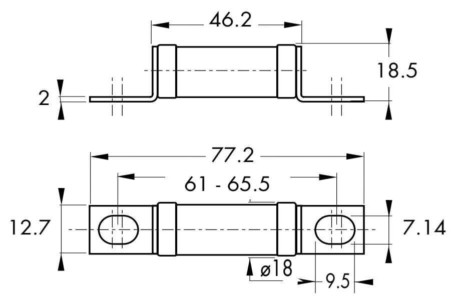
GERMAN STANDARD WITH SEPARATE BLOWN FUSE TRIP-INDICATOR DIN 43623/00C



Weight: 40 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
12	6,9 gRB 17 D08P 12	X221004
16	6,9 gRB 17 D08P 16	Y221005
20	6,9 gRB 17 D08P 20	Z221006
25	6,9 gRB 17 D08P 25	A221007
32	6,9 gRB 17 D08P 32	B221008
35	6,9 gRB 17 D08P 35	C221009
40	6,9 gRB 17 D08P 40	D221010
45	6,9 gRB 17 D08P 45	E221011
50	6,9 gRB 17 D08P 50	F221012
55	6,9 gRB 17 D08P 55	G221013
63	6,9 gRB 17 D08P 63	H221014
75	6,9 gRB 17 D08P 75	J221015
80	6,9 gRB 17 D08P 80	K221016
90	6,9 gRB 17 D08P 90	L221017
100	6,9 URB 17 D08P 100	M221018

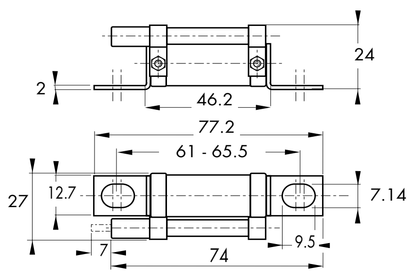
BRITISH STANDARD WITHOUT BLOWN FUSE INDICATION



Weight: 37 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
12	6,9 gRB 17/12	W220957
16	6,9 gRB 17/16	X220958
20	6,9 gRB 17/20	Y220959
25	6,9 gRB 17/25	Z220960
32	6,9 gRB 17/32	A220961
35	6,9 gRB 17/35	B220962
40	6,9 gRB 17/40	C220963
45	6,9 gRB 17/45	D220964
50	6,9 gRB 17/50	E220965
55	6,9 gRB 17/55	F220966
63	6,9 gRB 17/63	G220967
75	6,9 gRB 17/75	H220968
80	6,9 gRB 17/80	J220969
90	6,9 gRB 17/90	K220970
100	6,9 URB 17/100	L220971

BRITISH STANDARD WITH SEPARATE BLOWN FUSE TRIP-INDICATOR BS 88-4



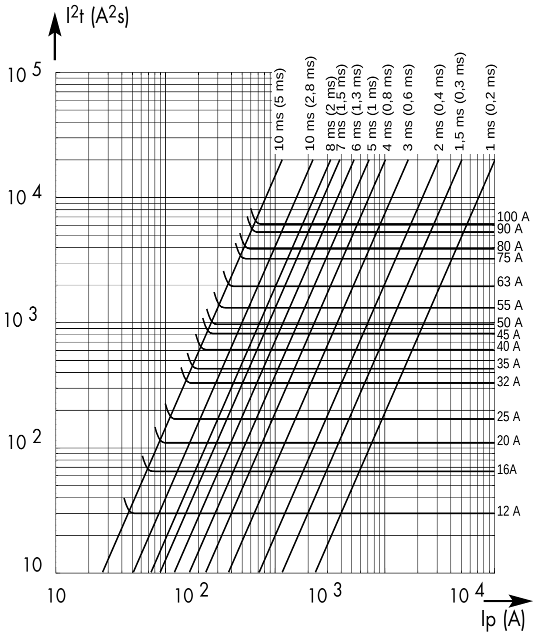
Weight: 49 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
12	6,9 gRB 17P12	D220987
16	6,9 gRB 17P16	E220988
20	6,9 gRB 17P20	F220989
25	6,9 gRB 17P25	G220990
32	6,9 gRB 17P32	H220991
35	6,9 gRB 17P35	J220992
40	6,9 gRB 17P40	K220993
45	6,9 gRB 17P45	L220994
50	6,9 gRB 17P50	M220995
55	6,9 gRB 17P55	N220996
63	6,9 gRB 17P63	P220997
75	6,9 gRB 17P75	Q220998
80	6,9 gRB 17P80	R220999
90	6,9 gRB 17P90	S221000
100	6,9 URB 17P100	T221001

DIN Fuses

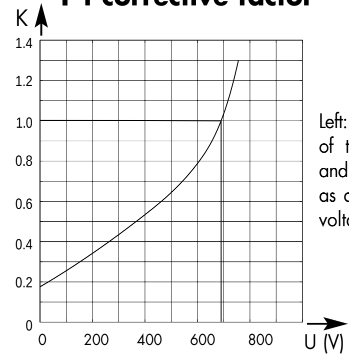
6,9 gRB-URB

Total clearing I^2t



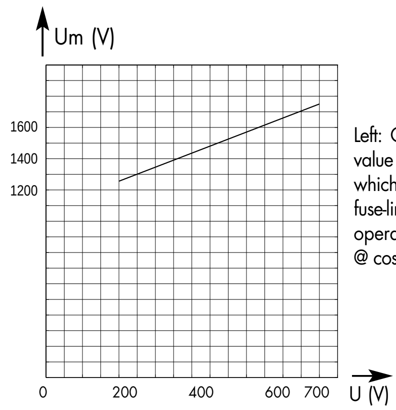
Above: Horizontal curves show for each rated current maximum values of total clearing I^2t (I^2t_t) as a function of prospective current Ip. @ 690 V.
cosφ = 0.15.
Oblique lines indicate total clearing duration Tt andassociated pre-arcing duration in brackets.

I^2t corrective factor



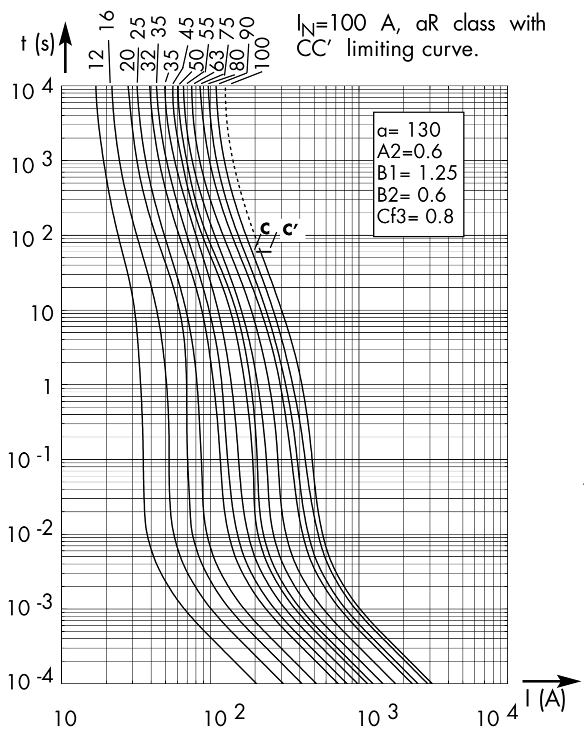
Left: Curve shows variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.

Peak arc voltage



Left: Curve shows peak value Um of arc voltage which appears across fuse-link as a function of operating voltage U @ cos φ = 0.15

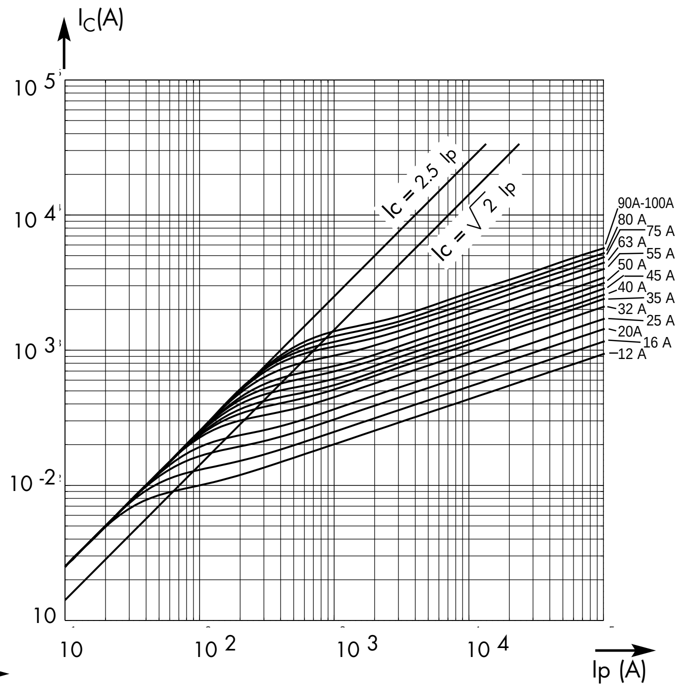
Time vs current characteristics



Tolerance for mean pre-arcing current ± 9%.

Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

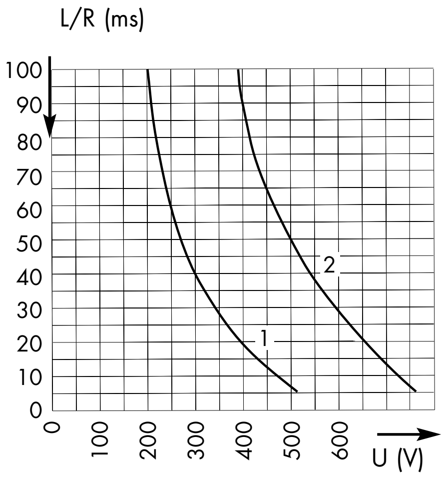
Current limitation curves



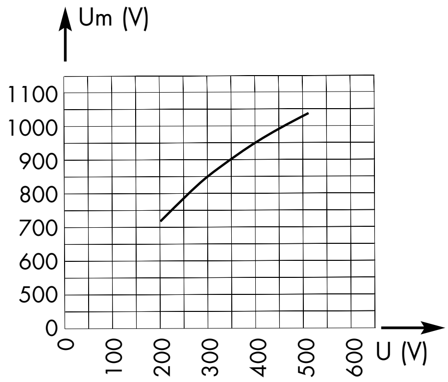
Above: Curves show, for each rating, value of peak let-through current I_C as a function of available fault current Ip.

DIN Fuses 6,9 gRB-URB

DC Application data

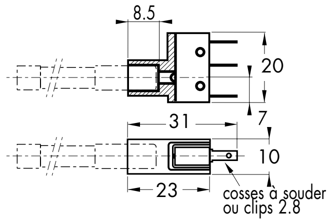


Above: Curves indicate permissible value of time constant L/R as a function of DC working voltage.
Curve 1: Ip 1,6 I_N only for fuses gRB (current rating from 12 to 50 A)
Curve 2: Ip 8 I_N for fuses gRB et URB



Curve indicates peak arc voltage Um which may appear across the fuse terminals at working voltage U.

Microswitch



Cat. Num.	Ref. Num.	Weight	Pack.
MC 6,3 GR 2.5	Y 310015	10 g	3 pieces

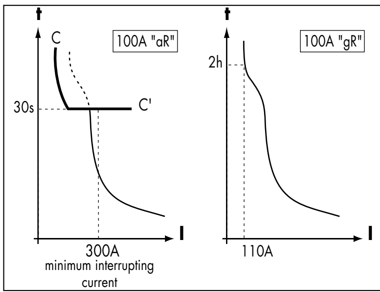
Electrical characteristics:
I_N = 3 A - U_N = 250 VAC
I_N = 2 A - U_N = 30 VDC

Certain minimum operating voltage/current
20 V-100 mA

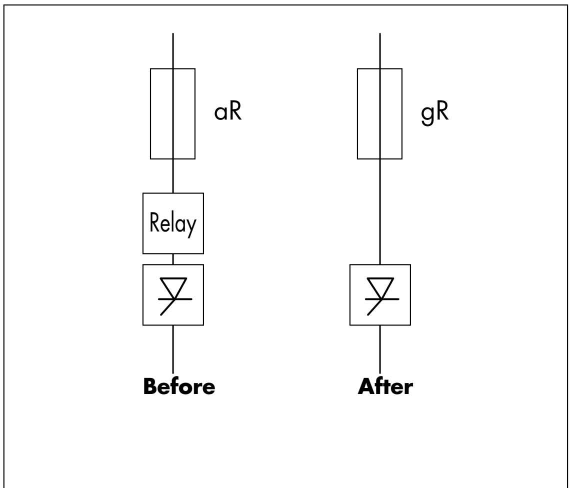
NEW gR-CLASS

OPTIMAL PROTECTION OF POWER EQUIPMENT

Thanks to recent technological developments, Ferraz Shawmut today markets gR-class PROTISTOR® fuses capable of clearing all types of overloads, from low multiples of current ratings up to very high short-circuit currents. Enhanced performance enables these fuses to provide solutions to many previously unsolved problems in power electronics: protection of cables without the use of additional components, protection of equipment from fire hazards, selective coordination of different fuses within a single power distribution installation...



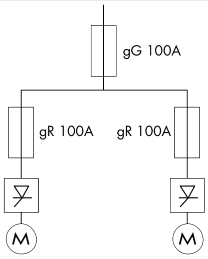
Example:
100A aR vs. 100A gR



SELECTIVE COORDINATION

gR-class semiconductor fuses can be utilized in association with gI and gG-class low voltage power distribution fuses of the same current rating, installed upstream. In a "selectively coordinated" distribution installation, melting is limited to the fuse associated with the faulted circuit, while upstream fuses remain intact. This prevents unnecessary down-time due to power blackouts in non-faulted branches.

Example of selective coordination-



aR-CLASS vs. gR-CLASS

aR-class fuses feature a high minimum interrupting current as compared with their current rating. The primary time-current characteristic of aR-class fuses is the CC' curve, above which another protection device must be associated. The gR-class fuse represents considerably improved performance in semiconductor protection.

FERRAZ SHAWMUT EXPERTISE

gR-class fuses should be used in the design of low voltage equipment and in the protection of power electronics equipment. Designers can often substitute a gR-class fuse for an aR-class fuse (10x38, 14x51, 22x58, PSC 000 and 17x49 DIN80 or BS 88-4) but the reverse is not true: an aR fuse can never replace a gR fuse. Start protecting your new equipment with gR-class fuses today. The application of gR class fuses, with current ratings less than 100 Amps, offers enhanced protection, safety and reliability, along with reduced risk of replacement errors and assembly costs.

Semiconductor Fuses

European Fuses

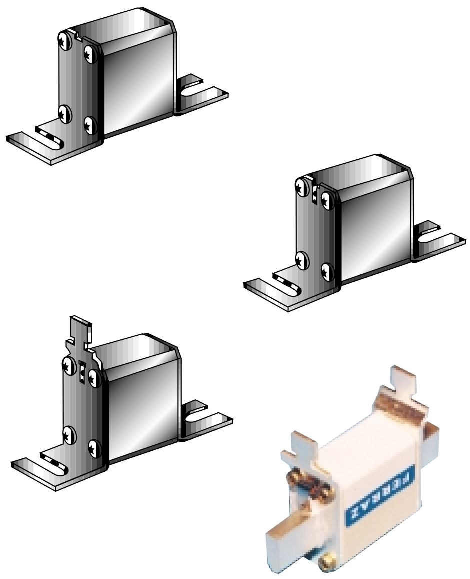
DIN 000 Fuses — 6,6 gRB-URB - 5 URB

New

GERMAN STANDARD
500 - 660 V AC
gRB - URB from 20 to 400 A
Size: 000

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS ACCORDING TO 269.1 AND 4
- 500- 660 V VOLTAGE RATING (RATING 20 TO 400 A)
- gR CLASS (gRB RATINGS 20 TO 125 A) ACCORDING TO VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVING SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION WITH ALL FUSES

  aR CLASS (URB RATINGS 80 TO 400 A) ACCORDING TO VDE 636-23 AND IEC 269.4
- 3 MODELS COMPLYING WITH DIN 43653-00C ARE cULus WITH OR WITHOUT BLOWN FUSE INDICATION - WITH TRIP INDICATOR
- MODEL COMPLYING WITH DIN 43620 (00C) STANDARD WITH BLOWN FUSE INDICATION - WITH TRIP INDICATOR



MAIN CHARACTERISTICS

Voltage rating U_N(V)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss		Tested interrupting rating	Estimated interrupting rating
					0.8 I_N	I_N		
660 690+6%	gRB	20 25 32 40 50 63 80 100 125	12 20 39 70 102 210 475 970 1900	80 150 270 460 730 1500 2900 6000 11800	3.8 5.0 5.5 6.6 7.7 8.8 9.9 11 11.6	7 9 10 12 14 16 18 20 21	200 k A @ 660 V	300 k A @ 660 V
660 690+6%	URB	80 100 125 160 200 250 315	390 690 1300 2700 5250 9900 15500	2500 4200 8900 16000 31500 52000 82000	11.6 12.7 14.3 17.0 19.8 24.8 31.9	21 23 26 31 36 45 58	200 k A @ 660 V	300 k A @ 660 V
500	URB	350 400	22400 33200	110000 160000	31.9 36.3	58 66	120 k A @ 500 V	

Minimum operating voltage for blown fuse indicator: 20 V
Minimum operating voltage for trip-indicator: 20 V

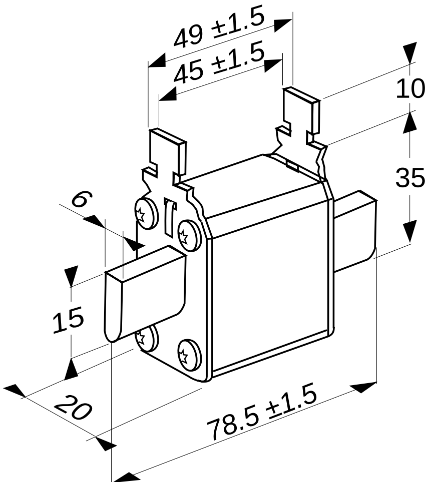
Semiconductor Fuses

European Fuses

DIN 000 Fuses

6,6 gRB-URB - 5 URB

GERMAN STANDARD BLADE-TYPE DIN 43620 (these fuses not UL Recognized



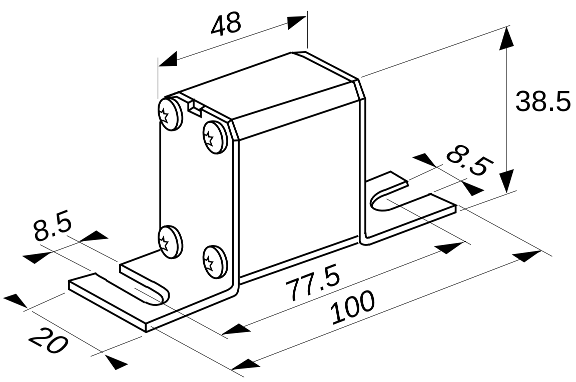
Microswitches
MS 4L 2-5 B6 + PRES Ref. F210156
MS 4L 2-5 B2 + PRES Ref. G210157

* Fuse base: 00-EP Ref Number F215170
Pull out grip handle: Ref Number K217244

Weight: 150g
Packaging: 3 pieces

Size	Catalog Number	Reference number	I/I_N*
16	6,6 GRB 000 PV 016	Y210609	1
20	6,6 GRB 000 PV 020	Z210610	1
25	6,6 GRB 000 PV 025	A210611	1
32	6,6 GRB 000 PV 032	B210612	1
40	6,6 GRB 000 PV 040	C210613	1
50	6,6 GRB 000 PV 050	D210614	1
63	6,6 GRB 000 PV 063	E210615	1
80	6,6 GRB 000 PV 080	F210616	1
100	6,6 GRB 000 PV 100	G210617	1
125	6,6 GRB 000 PV 125	H210618	1
80	6,6 URB 000 PV 080	J210619	1
100	6,6 URB 000 PV 100	K210620	1
125	6,6 URB 000 PV 125	L210621	0,95
160	6,6 URB 000 PV 160	M210622	0,85
200	6,6 URB 000 PV 200	N210623	0,85
250	6,6 URB 000 PV 250	P210624	0,8
315	6,6 URB 000 PV 315	Q210625	0,7
350	5 URB 000 PV 350	R210626	0,7
400	5 URB 000 PV 400	S210627	0,65

GERMAN STANDARD WITHOUT BLOWN FUSE INDICATOR



* Fuse base: SI 000 DIN 80
Ref. Number: C220710

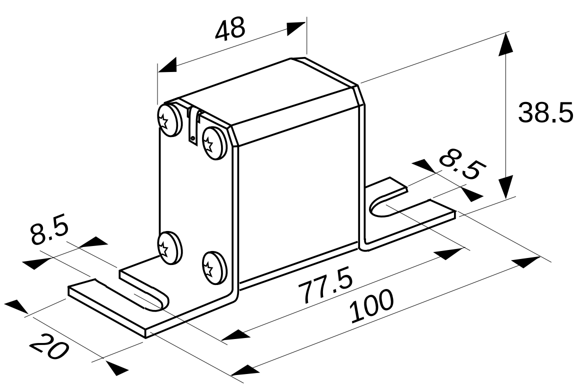
Weight: 110 g
Packaging: 6 pieces

Current ratintg	Catalog Number	Reference number	I/I_N*
20	6,6 GRB 000 D08 / 020	D330030	1
25	6,6 GRB 000 D08 / 025	E330031	1
32	6,6 GRB 000 D08 / 032	F330032	1
40	6,6 GRB 000 D08 / 040	G330033	1
50	6,6 GRB 000 D08 / 050	H330034	1
63	6,6 GRB 000 D08 / 063	J330035	1
80	6,6 GRB 000 D08 / 080	A330073	1
100	6,6 GRB 000 D08 / 100	S330112	1
125	6,6 GRB 000 D08 / 125	T330113	0,9
80	6,6 URB 000 D08 / 080	K330036	1
100	6,6 URB 000 D08 / 100	L330037	1
125	6,6 URB 000 D08 / 125	M330038	0,9
160	6,6 URB 000 D08 / 160	N330039	0,85
200	6,6 URB 000 D08 / 200	P330040	0,85
250	6,6 URB 000 D08 / 250	Q330041	0,8
315	6,6 URB 000 D08 / 315	R330042	0,7
350	5 URB 000 D08 / 350	V330114	0,7
400	5 URB 000 D08 / 400	D330191	0,65

European Fuses

DIN 000 Fuses 6,6 gRB-URB - 5 URB

GERMAN STANDARD WITH BLOWN FUSE INDICATOR

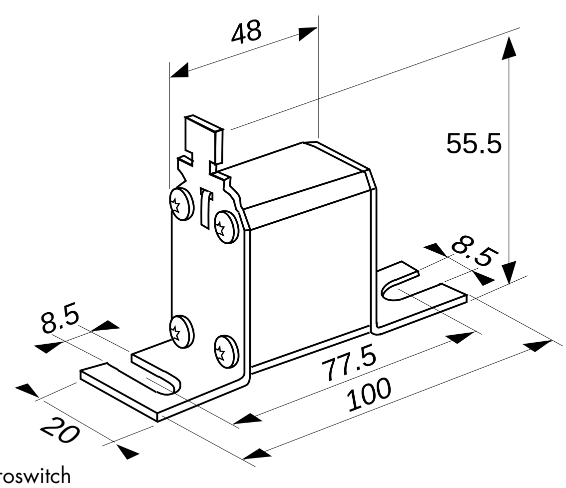


Current rating	Code	Ref. Number	I/IN Fuse-base *
20	6,6 gRB 000 DO8V/020	P330017	1
25	6,6 gRB 000 DO8V/025	Q330018	1
32	6,6 gRB 000 DO8V/032	R330019	1
40	6,6 gRB 000 DO8V/040	S330020	1
50	6,6 gRB 000 DO8V/050	T330021	1
63	6,6 gRB 000 DO8V/063	V330022	1
80	6,6 gRB 000 DO8V/080	G330102	1
100	6,6 gRB 000 DO8V/100	Q330110	1
125	6,6 gRB 000 DO8V/125	R330111	0,9
80	6,6 URB 000 DO8V/080	W330023	1
100	6,6 URB 000 DO8V/100	X330024	1
125	6,6 URB 000 DO8V/125	Y330025	0,95
160	6,6 URB 000 DO8V/160	Z330026	0,85
200	6,6 URB 000 DO8V/200	A330027	0,85
250	6,6 URB 000 DO8V/250	B330028	0,8
315	6,6 URB 000 DO8V/315	C330029	0,7
350	5 URB 000 DO8V/350	W330115	0,7
400	5 URB 000 DO8V/400	E330192	0,65

* Fuse base: SI 000 DIN 80
Ref. Number: C 220710

Weight: 110 g
Packaging: 6 pieces

GERMAN STANDARD WITH BLOWN FUSE TRIP-INDICATOR



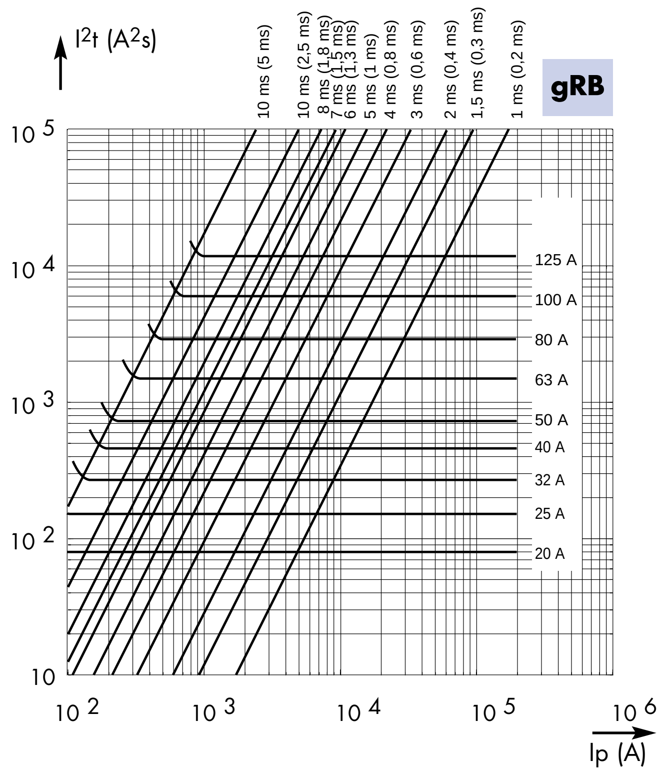
Current rating	Code	Ref. Number	I/IN Fuse-base *
20	6,6 gRB 000 DO8L/020	J330173	1
25	6,6 gRB 000 DO8L/025	K330174	1
32	6,6 gRB 000 DO8L/032	L330175	1
40	6,6 gRB 000 DO8L/040	M330176	1
50	6,6 gRB 000 DO8L/050	N330177	1
63	6,6 gRB 000 DO8L/063	P330178	1
80	6,6 gRB 000 DO8L/080	Q330179	1
100	6,6 gRB 000 DO8L/100	R330180	1
125	6,6 gRB 000 DO8L/125	S330181	0,9
80	6,6 URB 000 DO8L/080	T330182	1
100	6,6 URB 000 DO8L/100	V330183	1
125	6,6 URB 000 DO8L/125	W330184	0,9
160	6,6 URB 000 DO8L/160	X330185	0,85
200	6,6 URB 000 DO8L/200	Y330186	0,85
250	6,6 URB 000 DO8L/250	Z330187	0,8
315	6,6 URB 000 DO8L/315	A330188	0,7
350	5 URB 000 DO8L/350	B330189	0,7
400	5 URB 000 DO8L/400	F330193	0,65

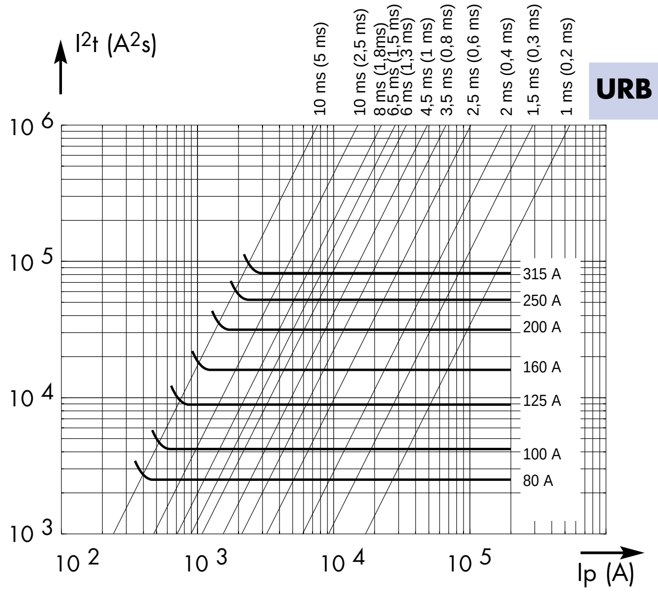
Microswitch
MC 4L 2-5 B6 + PRES Ref. Number : F210156
MC 4L 2-5 B2 + PRES Ref. Number : G210157
* Fuse base: SI 000 DIN 80 Ref. Number : C 20710

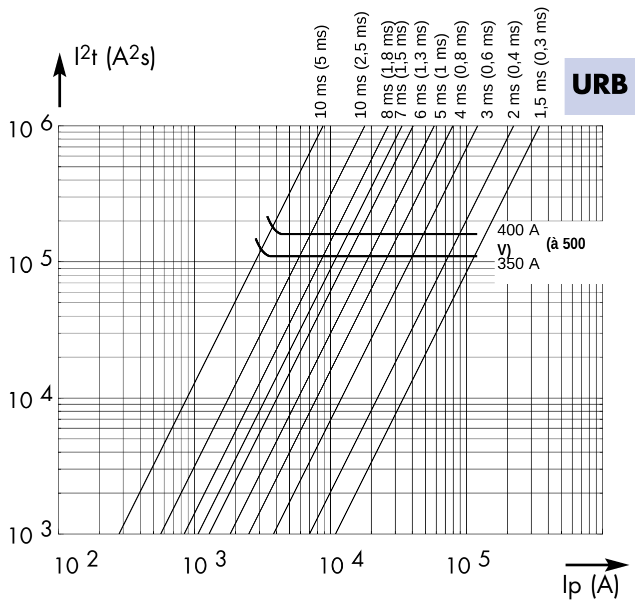
Weight: 120 g
Packaging: 6 pieces

DIN 000 Fuses — 6,6 gRB-URB - 5 URB

Total clearing I²t

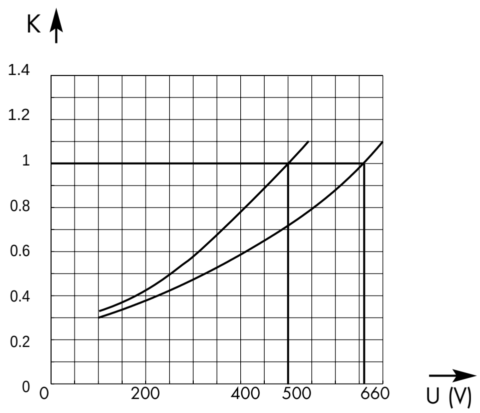






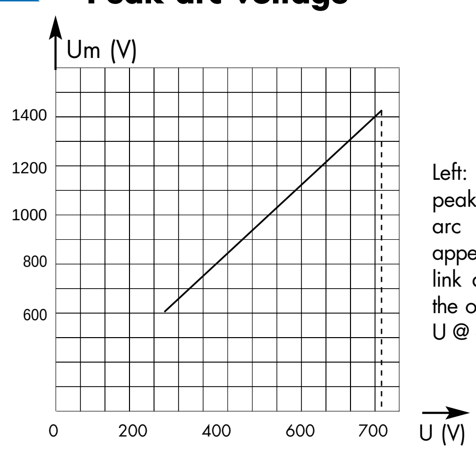
Above: Horizontal curves show, for each rated current, values of total clearing I²t (I^2t_t) as a function of prospective current Ip. @ U_N with cosj = 0.15. Oblique lines indicate total clearing duration Tt, with associated pre-arcing duration in brackets.

I²t corrective factor



Above: Mean curves show variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.

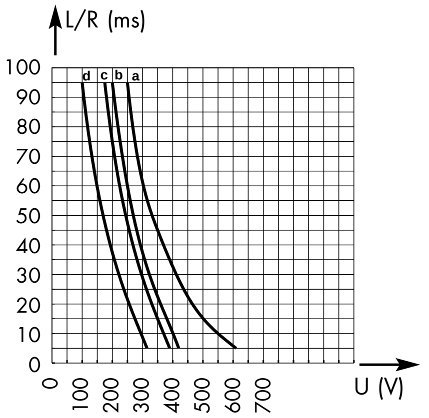
Peak arc voltage



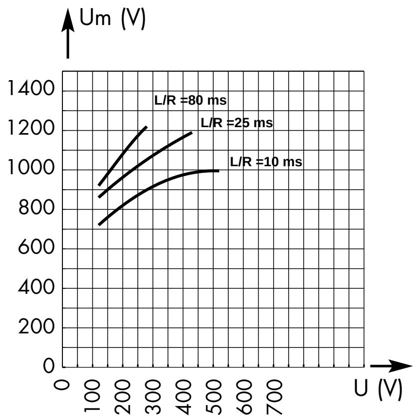
Left: Curve shows peak value Um of arc voltage which appears across fuse link as a function of the operating voltage U @ cos φ = 0.15

DIN 000 Fuses 6,6 gRB-URB - 5 UR

DC Application data



Above: Curves indicate permissible value of time constant L/R as a function of DC working voltage.
Curve a: Ratings from 20 to 160 A
Curve b: Rating 200 A
Curve c: Ratings from 250 to 315 A
Curve d: Ratings from 350 to 400 A



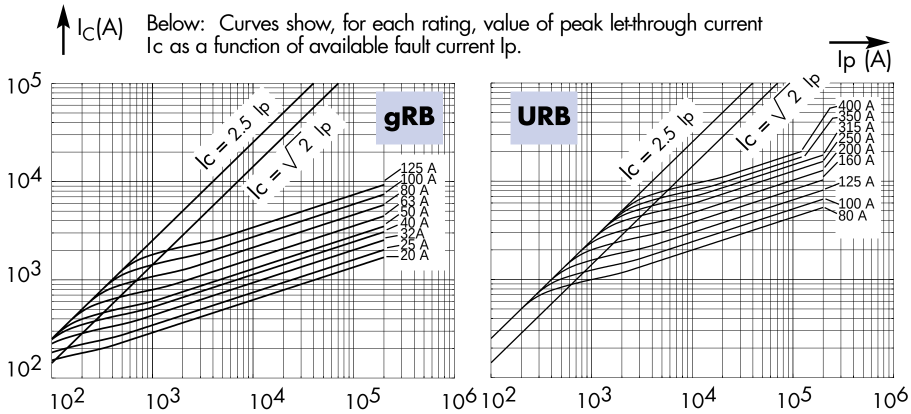
Above: Curves indicates peak arc voltage Um which may appear across fuse terminals at working voltage U.

Rated current	Curve	Ipm (A)
20	a	60
25	a	65
32	a	90
40	a	120
50	a	150
63	a	200
80	a	270
100	a	370
125	a	500
160	a	700
200	b	1200
250	c	1800
315	c	2200
350	d	2600
400	d	3100

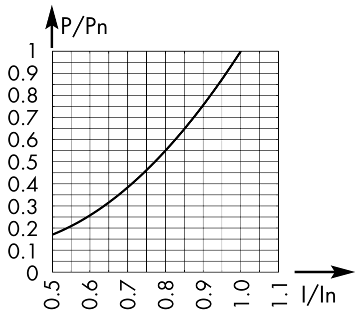
Ipm values give minimum DC interrupting current in amps.

Current limitation curves

Below: Curves show, for each rating, value of peak let-through current Ic as a function of available fault current Ip.

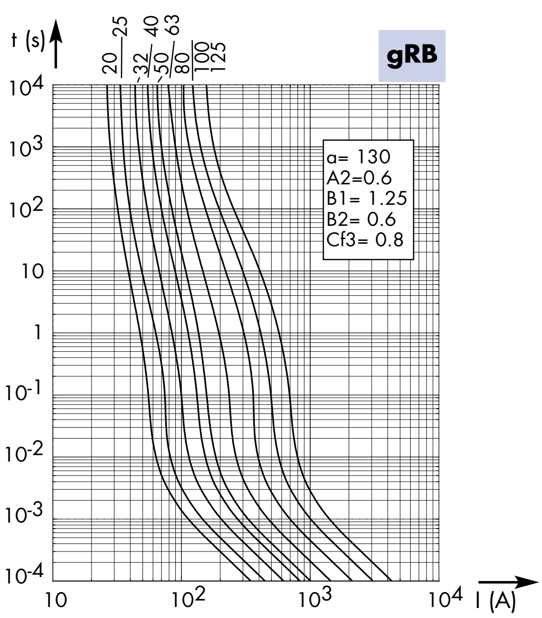


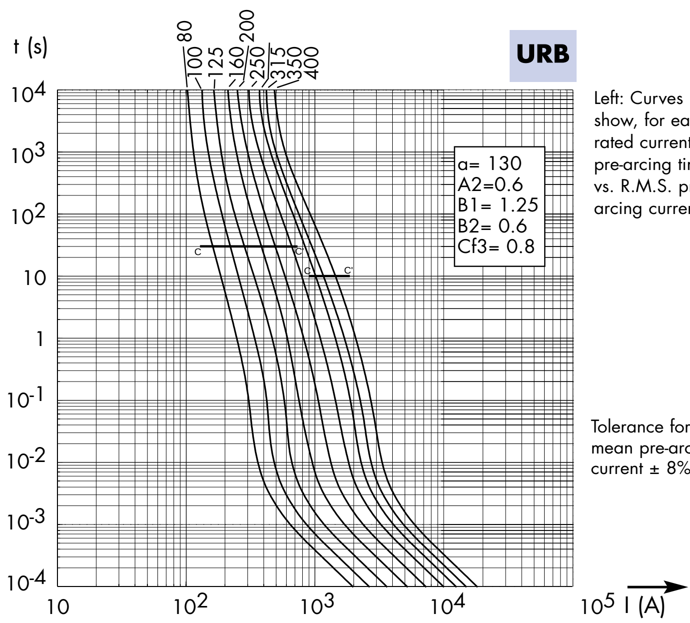
Watts loss



Above: Curve enables computation of power losses P for a I_N-rated fuse as a function of R.M.S. current I (as a multiple of I_N for steady state operation)

Time vs current characteristics





Left: Curves show, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Tolerance for mean pre-arcing current ± 8%.

Semiconductor Fuses

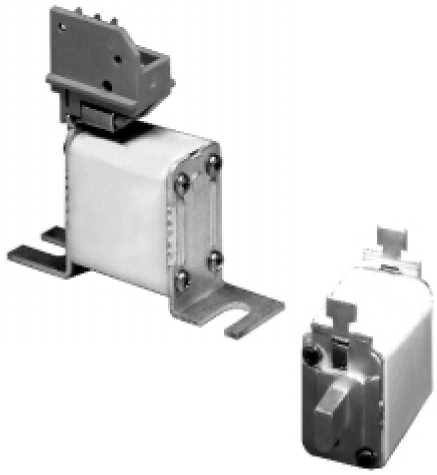
European Fuses

DIN 00 Fuses

6,9 gRB-URB - 6 URB

690 V ~
gRB-URB from 16 to 450 A
Size: 00

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 690 V VOLTAGE RATING
- gR CLASS (gRB RATINGS 16 to 160 A) AS PER VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVING SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION WITH ALL FUSES
- aR CLASS (URC AND URD RATINGS 16 TO 450 A) ACCORDING TO VDE 636-23 AND IEC 269.4
- CONNECTIONS ACCORDING TO
  - DIN 43653/00C 80 AND 110 mm BETWEEN AXES
  - DIN 43620/00 SOLID BLADES
- WITH AN INDICATING PAWL ACTIVATING A MICROSWITCH IF NEEDED



MAIN CHARACTERISTICS

Voltage rating U_N(V)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating	Estimated interrupting rating
690	gRB	16	8	61	2.7	5	200 k A @ 690 V	300 k A @ 690 V
		20	12	86	3.3	6		
		25	18	140	4.4	8		
		32	39	250	6.0	11		
		40	68	450	7.1	13		
		50	116	750	8.8	16		
		63	210	1400	9.9	18		
		80	525	3000	10.5	19		
		100	970	5400	10.7	19.5		
		125	1710	9600	13.2	24		
		160	4270	22400	13.7	25		
	URB	16	7	52	3.8	7	200 k A @ 690 V	300 k A @ 690 V
		20	10	75	5.0	9		
		25	15	120	6.0	11		
		32	32	210	8.2	15		
		40	61	400	9.9	18		
		50	102	700	11.5	21		
		63	177	1200	12.6	23		
		80	390	2200	13.8	25		
		100	692	3900	15.4	28		
		125	1170	6600	18.1	33		
		160	2680	14 000	19.8	36		
		200	4690	24 000	23.1	42		
		250	8300	42 500	27.5	50		
		315	17 520	81 000	31.9	58		
		350 •	25 450	118 000	33.0	60		
		400 •	33 200	150 000	38.5	70		
600	URB	450 **	51 850	225 000	40.7	74	200 k A @ 600 V	300 k A @ 600 V

NOTE: voltage rating of 350-400-450 A rated fuses is defined with a CC' curve at 1 second limited by minimum breaking current.

• Voltage rating: 690 V with CC' at 1s - 450 V with CC' at 10 s
** Voltage rating: 600 V with CC' at 1s - 450 V with CC' at 10 s

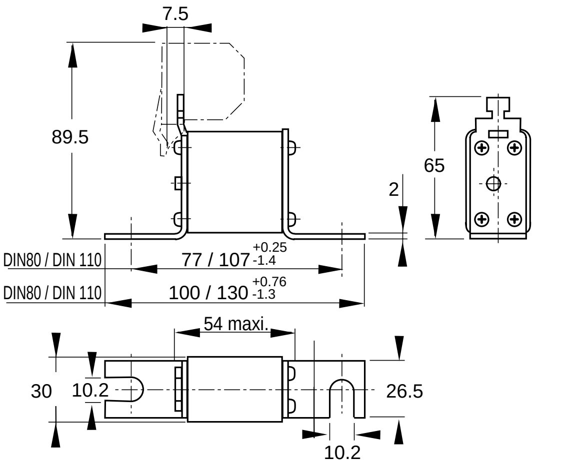
Minimum operating voltage for trip indicator = 20 V

DIN 00 Fuses

6,9 gRB-URB - 6 URB

GERMAN STANDARD AS PER DIN 43653/00C - DIN 80 & 110

	Current rating	Code	Ref. Number	I/IN Fuse-base
gRB DIN 80	16	6,9 gRB 00 D08L 016	S330273	1
	20	6,9 gRB 00 D08L 020	S330227	1
	25	6,9 gRB 00 D08L 025	T330228	1
	32	6,9 gRB 00 D08L 032	V330229	1
	40	6,9 gRB 00 D08L 040	W330230	1
	50	6,9 gRB 00 D08L 050	X330231	1
	63	6,9 gRB 00 D08L 063	Y330232	1
	80	6,9 gRB 00 D08L 080	Z330233	1
	100	6,9 gRB 00 D08L 100	A330234	1
	125	6,9 gRB 00 D08L 125	B330235	0.9
	160	6,9 gRB 00 D08L 160	C330236	0.9

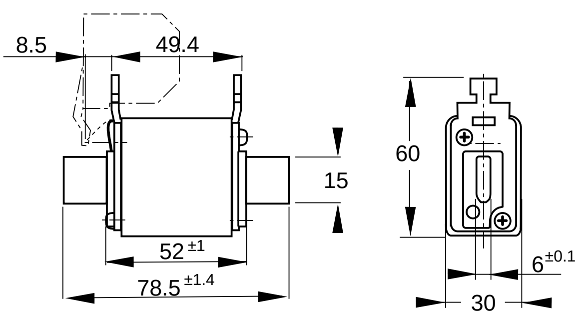


Weight: 140 g(D08) - 190 g(D11)
Packaging: 3 pieces
Microswitches:
6.3 clips | MC 4L 2.5 B6 - Ref. Number: L076646
or MC 4L 2.5 B6 + PRES - Ref. Number: F210156
2.8 clips | MC 4L 2.5 B2 - Ref. Number: G076642
or MC 4L 2.5 B2 + PRES - Ref. Number: G210157

Fuse-base: SI 00 DIN 80 - Ref. Number: Q098040

	Current rating	Catalog Number	Ref. Number	I/IN Fuse-base
URB DIN 80	16	6,9 URB 00 D08L 016	V330275	1
	20	6,9 URB 00 D08L 020	T330274	1
	25	6,9 URB 00 D08L 025	M330268	1
	32	6,9 URB 00 D08L 032	N330269	1
	40	6,9 URB 00 D08L 040	P330270	1
	50	6,9 URB 00 D08L 050	Q330271	1
	63	6,9 URB 00 D08L 063	R330272	1
	80	6,9 URB 00 D08L 080	D330237	1
	100	6,9 URB 00 D08L 100	E330238	1
	125	6,9 URB 00 D08L 125	F330239	0.9
	160	6,9 URB 00 D08L 160	G330240	0.85
	200	6,9 URB 00 D08L 200	H330241	0.85
	250	6,9 URB 00 D08L 250	J330242	0.80
	315	6,9 URB 00 D08L 315	K330243	0.75
	350	6,9 URB 00 D08L 350	L330244	0.75
	400	6,9 URB 00 D08L 400	M330245	0.70
	450	6 URB 00 D08L 450	N330246	0.65
gRB DIN 110	16	6,9 gRB 00 D11L 016	W330276	1
	20	6,9 gRB 00 D11L 020	P330247	1
	25	6,9 gRB 00 D11L 025	Q330248	1
	32	6,9 gRB 00 D11L 032	R330249	1
	40	6,9 gRB 00 D11L 040	S330250	1
	50	6,9 gRB 00 D11L 050	T330251	1
	63	6,9 gRB 00 D11L 063	V330252	1
	80	6,9 gRB 00 D11L 080	W330253	1
	100	6,9 gRB 00 D11L 100	X330254	1
	125	6,9 gRB 00 D11L 125	Y330255	0.9
	160	6,9 gRB 00 D11L 160	Z330256	0.9
URB DIN 110	80	6,9 URB 00 D11L 80	A330257	1
	100	6,9 URB 00 D11L 100	B330258	1
	125	6,9 URB 00 D11L 125	C330259	0.9
	160	6,9 URB 00 D11L 160	D330260	0.85
	200	6,9 URB 00 D11L 200	E330261	0.85
	250	6,9 URB 00 D11L 250	F330262	0.80
	315	6,9 URB 00 D11L 315	G330263	0.75
	350	6,9 URB 00 D11L 350	H330264	0.75
	400	6,9 URB 00 D11L 400	J330265	0.70
	450	6 URB 00 D11L 450	K330266	0.65

GERMAN STANDARD AS PER DIN 43620/00



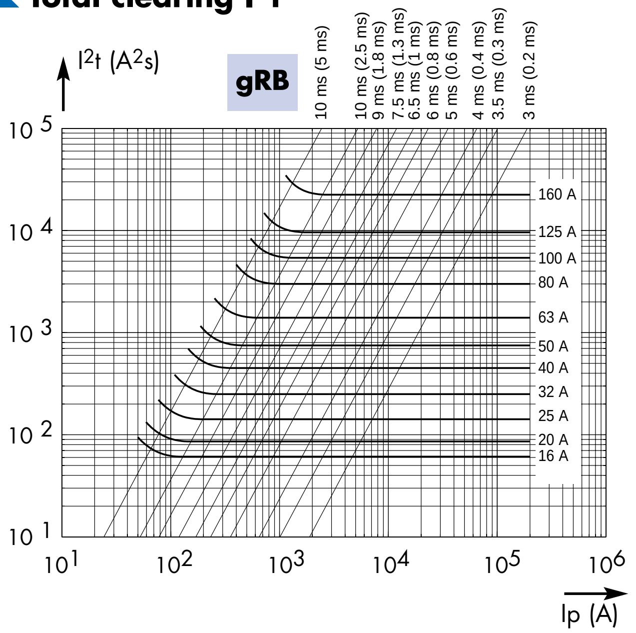
	Current rating	Catalog Number	Ref. Number	I/IN Fuse-base
gRB	16	6,9 gRB 00 PV/016	L330267	1
	20	6,9 gRB 00 PV/020	W330207	1
	25	6,9 gRB 00 PV/025	X330208	1
	32	6,9 gRB 00 PV/032	Y330209	1
	40	6,9 gRB 00 PV/040	Z330210	1
	50	6,9 gRB 00 PV/050	A330211	1
	63	6,9 gRB 00 PV/063	B330212	0.90
	80	6,9 gRB 00 PV/080	C330213	0.90
	100	6,9 gRB 00 PV/100	D330214	0.90
	125	6,9 gRB 00 PV/125	E330215	0.85
	160	6,9 gRB 00 PV/160	F330216	0.85
URB	80	6,9 URB 00 PV/080	G330217	0.90
	100	6,9 URB 00 PV/100	H330218	0.90
	125	6,9 URB 00 PV/125	J330219	0.85
	160	6,9 URB 00 PV/160	K330220	0.85
	200	6,9 URB 00 PV/200	L330221	0.85
	250	6,9 URB 00 PV/250	M330222	0.80
	315	6,9 URB 00 PV/315	N330223	0.75
	350	6,9 URB 00 PV/350	P330224	0.75
	400	6,9 URB 00 PV/400	Q330225	0.70
	450	6 URB 00 PV/450	R330226	0.65

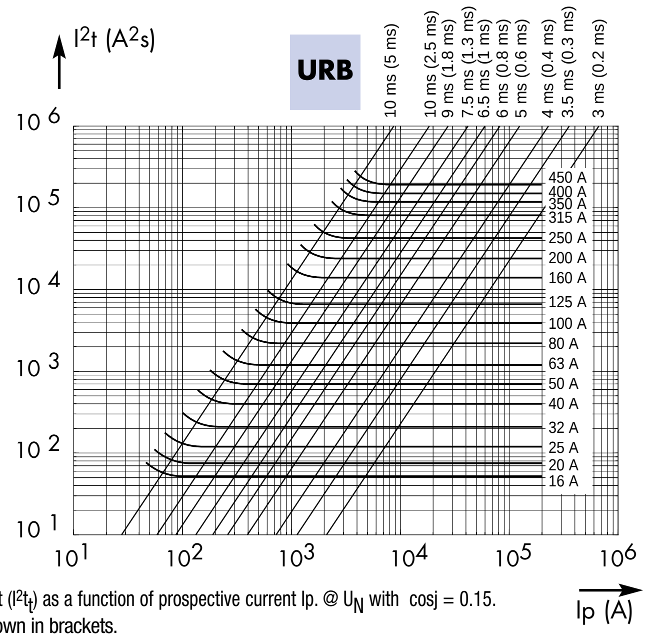
Weight: 210 g
Packaging: 3 pieces
Microswitches:
6.3 clips | MC 4L 2.5 B6 - Ref. Number: L076646
or MC 4L 2.5 B6 + PRES - Ref. Number: F210156
2.8 clips | MC 4L 2.5 B2 - Ref. Number: G076642
or MC 4L 2.5 B2 + PRES - Ref. Number: G210157

Fuse-base: 00EP - Ref. Number : F21517
I/IN : Ratio RMS steady current / current rating for fuses in base.

DIN 00 Fuses 6,9 gRB-URB - 6 URB

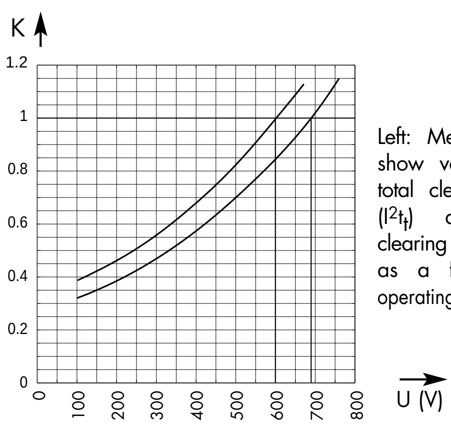
Total clearing I^2t





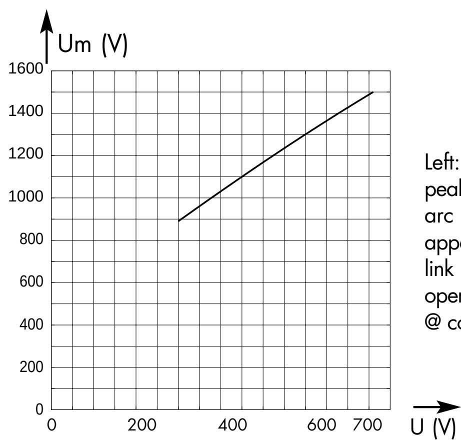
Above: horizontal curves show, for each rated current, maximum values of total clearing I^2t (I^2t_t) as a function of prospective current Ip. @ U_N with cosj = 0.15.
Oblique lines indicate total clearing duration Tt, with associated pre-arcing duration shown in brackets.

I^2t corrective factor



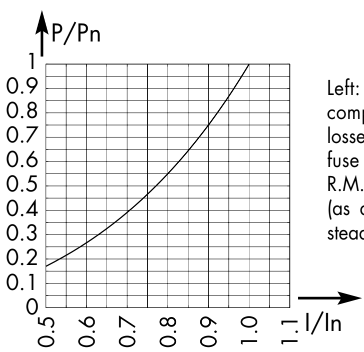
Left: Mean curves show variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.

Peak arc voltage



Left: Curve shows peak value Um of the arc voltage which appears across fuse-link as a function of operating voltage U @ cos φ = 0.15

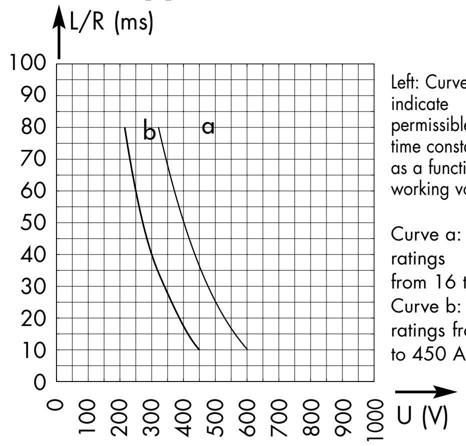
Watts loss



Left: Curve enables computation of power losses P for a I_N-rated fuse as a function of R.M.S. current I (as a multiple of I_N for steady state operation)

DIN 00 Fuses — 6,9 gRB-URB - 6 URB

DC Application data

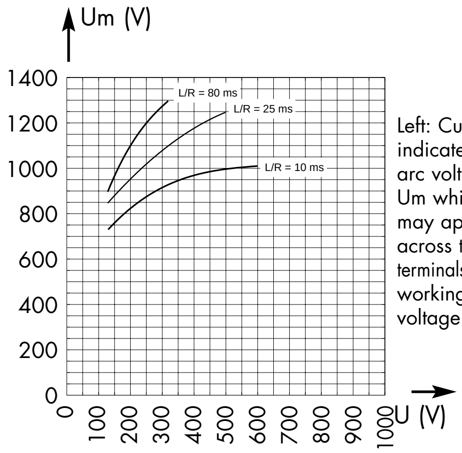


Left: Curves indicate permissible value of time constant L/R as a function of DC working voltage.

Curve a: for ratings from 16 to 250 A
Curve b: for ratings from 315 to 450 A

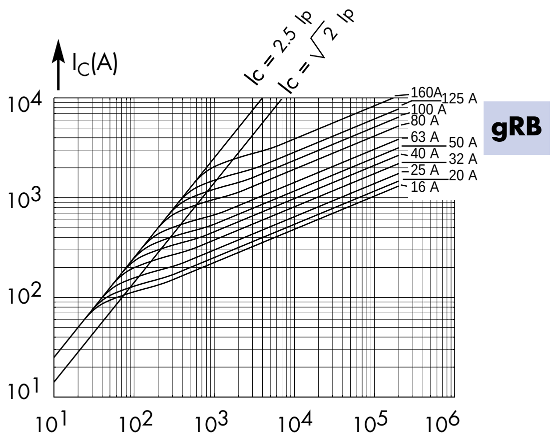
Rated current	Curve	Ipm (A) gRB	Ipm (A) URB
16	a	32	32
20	a	40	40
25	a	50	50
32	a	64	64
40	a	80	80
50	a	100	100
63	a	126	126
80	a	160	170
100	a	200	220
125	a	250	280
160	a	320	390
200	a		510
250	a		650
315	b		840
350	b		1770
400	b		2040
450	b		2250

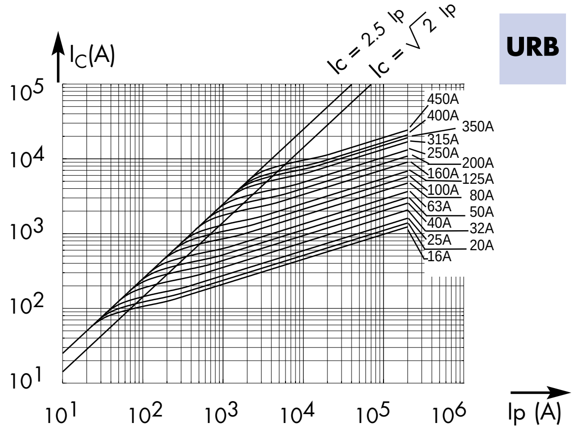
Ipm values give minimum DC interrupting current in amps.



Left: Curves indicate peak arc voltage Um which may appear across the fuse terminals at working voltage U.

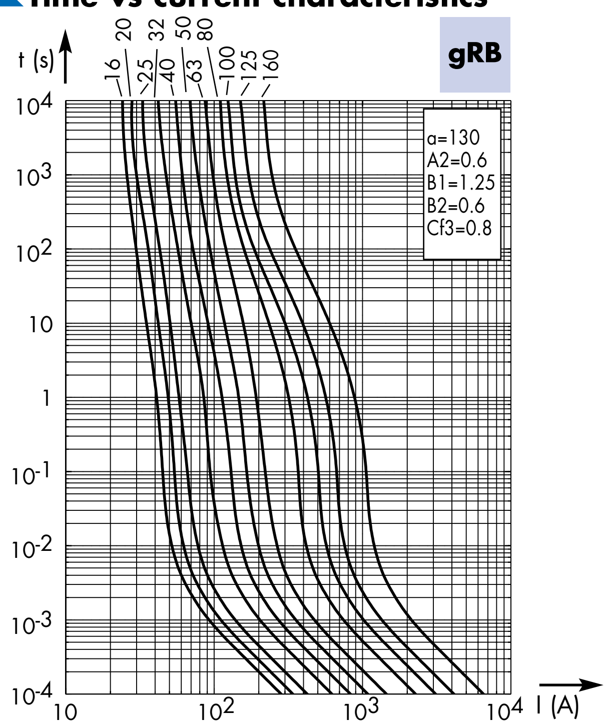
Current limitation curves

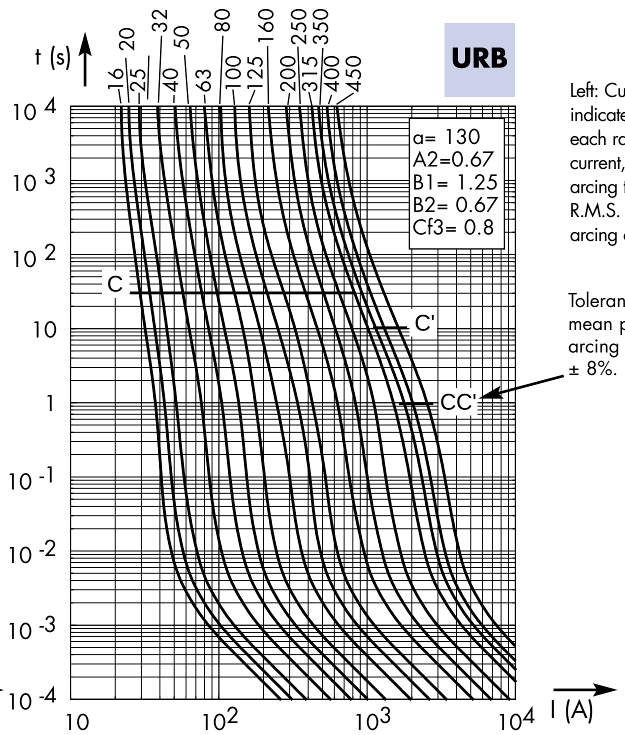




Above: Curves show, for each rating, value of peak let-through current Ic as a function of available fault current Ip.

Time vs current characteristics





Left: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Tolerance for mean pre-arcing current ± 8%.

BS88 Fuses 250V

BRITISH STANDARD
250 V - URE - URGS - URZ
From 5 to 180 A
Sizes 10x28 - 17x27

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 250 V VOLTAGE RATING COMPLYING WITH IEC 33
- GR CLASS (RATINGS FROM 5 TO 32 A) AS PER VDE 636-23 AND IEC 269.4
- aR CLASS (RATINGS FROM 7 to 180 A) COMPLYING WITH VDE 636-23 AND IEC 269.4
- TWO MODELS COMPLYING WITH BS 88-4
  - WITHOUT INDICATOR
  - WITH SEPARATE TRIP-INDICATOR (SIZE 17x27)
- 17x27 are UL Recognized

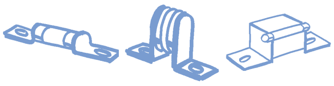


MAIN CHARACTERISTICS

Voltage rating U_N(V)	Size	Class	Current rating I_N(A)	pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ U_N A^2s		Watt losses		Tested interrupting rating
					$I_p \le 30\ I_N$	$I_p > 30\ I_N$	0.8 I_N	I_N	
250 V	10x28	URE	5	1.3	10	11	0.6	1	160 kA @ 250 V
			6	1.8	13	15	0.7	1.2	
			10	2.4	18	20	1.2	2.1	
			12	4.3	28	33	1.6	2.8	
			15	6.7	41	48	2.0	3.5	
			20	15.0	85	100	2.2	4.0	
			25	27.0	135	160	2.6	4.7	
			32	53.0	240	280	3.0	5.4	
	17x27	URGS	7	1.3	8,5	9,8	0.56	1	160 kA @ 250 V
			10	4.5	21	23,8	0.84	1.5	
			12	5.9	27	31	1.1	2.0	
			16	11.2	50	59	1.7	3.0	
			20	15.6	80	100	2.2	3.9	
			25	30.0	130	160	2.7	4.8	
			30	45.0	195	235	3.2	5.6	
			35	63.0	270	330	3.7	6.5	
			50	180.0	790	940	4.9	8.8	
			60	250.0	1100	1310	5.8	10.4	
			75	380.0	1670	1990	7.2	13.6	
			80	480.0	2100	2530	7.25	13.7	
		URZ	100	730.0	3350	4060	6.5	11.5	160 kA @ 250 V
			125	850.0	5720	6920	6.7	12.3	
			150	1250.0	7930	9590	7.4	13.6	
			160	1730.0	9600	11700	8.8	15.6	
			180	2090.0	14500	17500	9.5	17	

Minimum Operating voltage for separate trip indicator = 20 V

Semiconductor Fuses

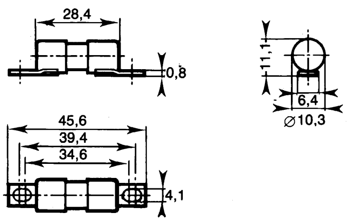


European Fuses

BS88 Fuses

250V

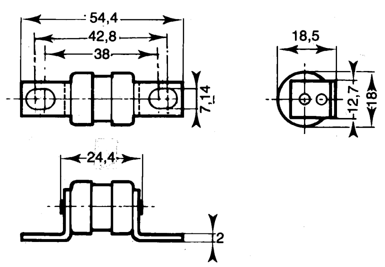
CP 10x28 - Without trip-indicator



**BS 88 part 4 requires respectively Ø 8.7 and 8.8

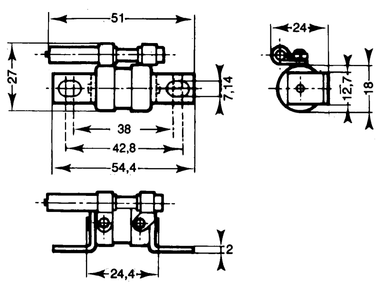
Size	Catalog Number	Ref. Number	Pack.
10x28	2.5 URE 10/5	M082489	10 (100 g)
	2.5 URE 10/6	E097478	
	2.5 URE 10/10	L082488	
	2.5 URE 10/12	P097487	
	2.5 URE 10/15	K082487	
	2.5 URE 10/20	J082486	
	2.5 URE 10/25	X097494	
	2.5 URE 10/32	N081984	

CP 17x27 - Without trip-indicator



Size	Catalog Number	Ref. Number	Pack.
17x27	2.5 URGS 17/7	M076647	10 (860 g)
	2.5 URGS 17/10	N076648	
	2.5 URGS 17/12	P076649	
	2.5 URGS 17/16	Q076650	
	2.5 URGS 17/20	L097507	
	2.5 URGS 17/25	R076651	
	2.5 URGS 17/30	S076652	
	2.5 URGS 17/35	T076653	
	2.5 URGS 17/50	V076654	
	2.5 URGS 17/60	W076655	
	2.5 URGS 17/75	X076656	
	2.5 URGS 17/80	Z085559	
	2.5 URZ 17/100	Y085558	
	2.5 URZ 17/125	G097526	
	2.5 URZ 17/150	W085556	
	2.5 URZ 17/160	F097527	
	2.5 URZ 17/180	N097532	

CP 17x27 - With separated trip-indicator BS88-4



Microswitch MC6.3 GR 2-5N Ref: Y301015

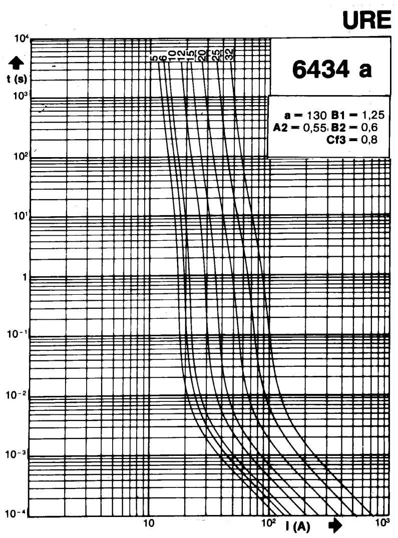
Size	Catalog Number	Ref. Number	Pack.
17x27	2.5 URGS 17 P 7	P097533	10 (930 g)
	2.5 URGS 17 P 10	Q097534	
	2.5 URGS 17 P 12	S097536	
	2.5 URGS 17 P 16	X097540	
	2.5 URGS 17 P 20	B097544	
	2.5 URGS 17 P 25	D097546	
	2.5 URGS 17 P 30	E097547	
	2.5 URGS 17 P 35	F097548	
	2.5 URGS 17 P 50	J097551	
	2.5 URGS 17 P 60	H081082	
	2.5 URGS 17 P 75	K097552	
	2.5 URGS 17 P 80	L097553	
	2.5 URZ 17 P 100	P097556	
	2.5 URZ 17 P 125	Q097557	
	2.5 URZ 17 P 150	R097558	
	2.5 URZ 17 P 160	S097559	
	2.5 URZ 17 P 180	T097560	

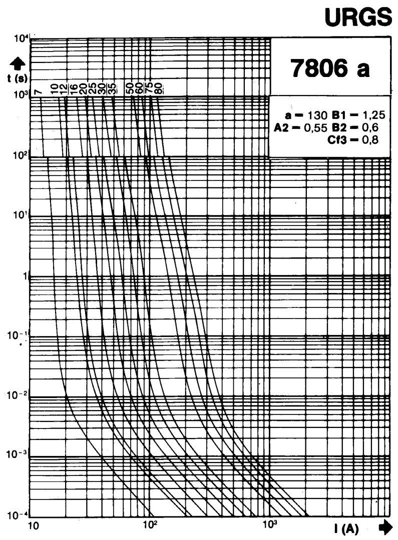
Microswitch MC 6.3 GR 2.5 N - Park# Y310015 - See technical data: Y 600413

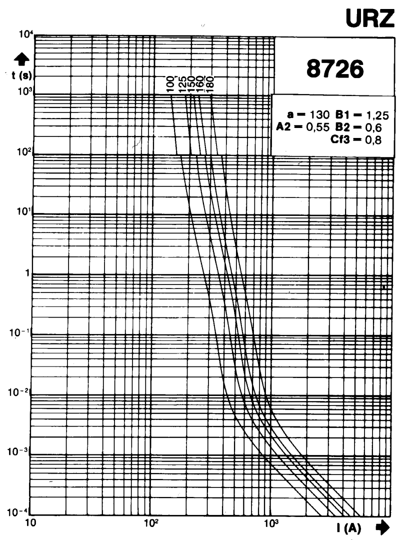
BS88 Fuses 250V

ELECTRICAL CHARACTERISTICS

Times vs current characteristics





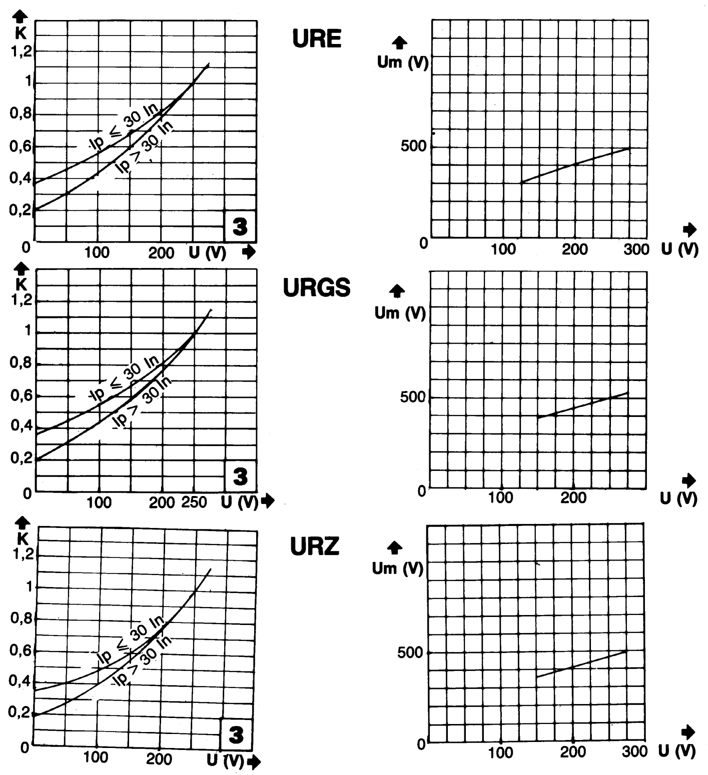


- *These curves indicate, for each rated current, the pre-arcing time vs. the R.M.S. pre-arcing current.*
- *Tolerance for the mean pre-arcing current ± 10%.*

Corrective factor - Peak arc voltage

Corrective factor

Peak arc voltage

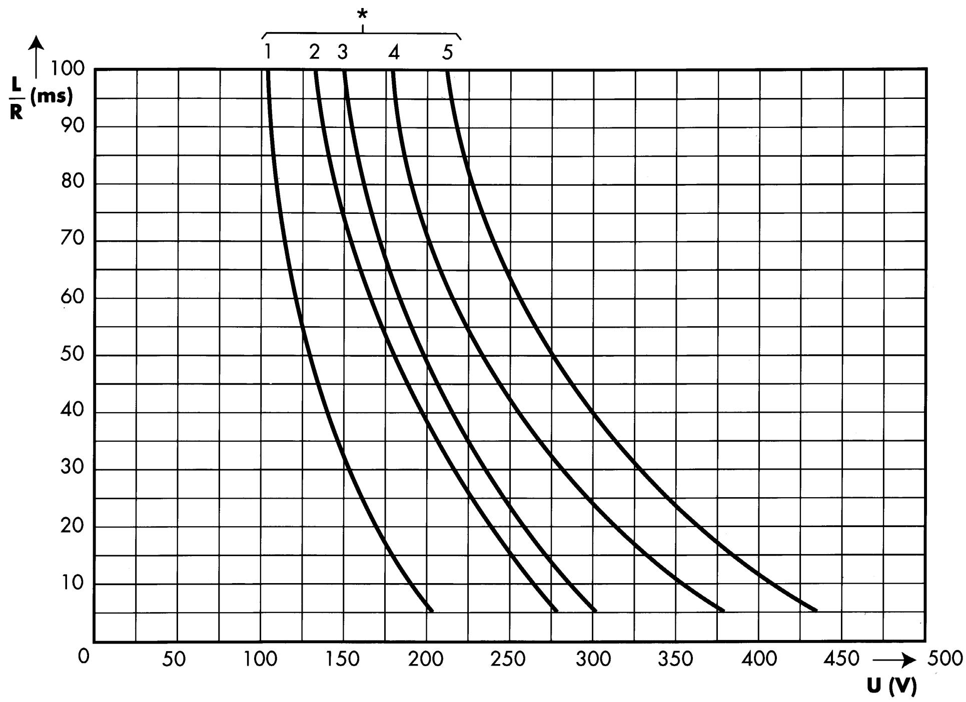


The mean curves show the variation of the total clearing time (I^2t_t) and the total clearing duration t_t as a function of operating voltage U.

This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of the operating voltage U @ cos φ = 0.15.

BS88 Fuses 250V

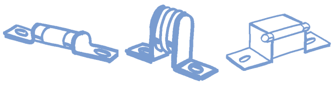
D.C. Applications data



- These curves indicate the permissible value of time constant L/R as a function of the D.C. working voltage.
- The Ipm values give the minimum DC interrupting current in amps.

Curves # and Ipm for each rating			
Class	Rated current	*	Ipm (A)
URE	5	5	40
	6	5	50
	10	5	55
	12	5	80
	15	5	100
	20	5	130
	25	5	175
	32	5	255
URGS	7	5	40
URZ	100	4	190
	125	3	250
	150	2	300
	160	2	330
	180	1	400

Semiconductor Fuses

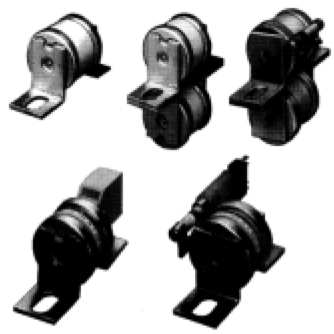


European Fuses

BS88 Fuses 250V

BRITISH STANDARD
250 V - URGG - URGH
From 50 to 1050 A
Sizes 36x27 - 2x36x27

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 250 V VOLTAGE RATING COMPLYING WITH IEC 33
- GR CLASS (RATINGS FROM 50 TO 350 A URGG - 300 TO 700 A URGH) AS PER VDE 636-23 AND IEC 269.4
- aR CLASS (RATINGS FROM 400 to 525 A URGG - 800 to 1050 A URGH) COMPLYING WITH VDE 636-23 AND IEC 269.4
- TWO MODELS COMPLYING WITH BS 88-4
  - WITHOUT INDICATOR
  - WITH SEPARATE TRIP-INDICATOR



MAIN CHARACTERISTICS

Voltage rating U_N(V)	Sizes	Class	Current rating I_N(A)	pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN A^2s	Watt losses 0.8 I_N	Watt losses I_N	Tested interrupting rating
250 V	36x27	URGG	50	120	500	4.75	9.5	100 kA @ 250 V
			75	330	1380	6.3	12.6	
			100	745	3060	7.8	15.7	
			125	1340	5500	9.1	18.2	
			150	1930	7950	10.8	21.6	
			200	4020	16400	13.5	27.0	
			250	5350	30000	16.3	32.6	
			300	7290	49600	18.6	37.2	
			350	18000	74000	21	42.0	
			400	25100	128000	23.4	46.7	
			450	33500	170000	27.1	54.1	
			500	43000	219000	30.4	60.8	
			525	48200	245000	33.2	66.4	
	2x36x27	URGH	300	7700	31800	21.6	43.2	100 kA @ 250 V
			350	11500	48700	24.3	48.6	
			400	16000	65600	27	54.0	
			500	29100	120000	32.6	65.2	
			600	48200	198500	37.2	74.4	
			700	72000	276000	42.0	84.0	
			800	100000	512000	46.7	93.4	
			900	134000	680000	54.1	108.2	
			1000	172000	876000	60.8	121.6	
			1050	193000	980000	66.4	132.8	

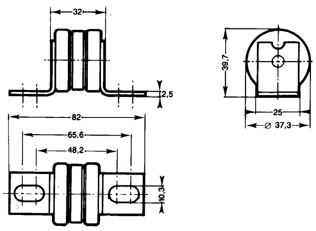
Minimum operating voltage for separate or integrated trip indicator = 20 V

Ferraz Shawmut

BS88 Fuses

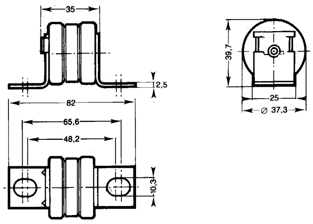
250V

CP 36x27 - Without trip-indicator



Size	Catalog Number	Ref. Number	Pack.
36x27	2.5 URGG 36/50	J080945	6 (910 g)
	2.5 URGG 36/75	K080946	
	2.5 URGG 36/100	L080947	
	2.5 URGG 36/125	R082470	
	2.5 URGG 36/150	Q082469	
	2.5 URGG 36/200	P082468	
	2.5 URGG 36/250	N082467	
	2.5 URGG 36/300	M082466	
	2.5 URGG 36/350	L082465	
	2.5 URGG 36/400	G075538	
	2.5 URGG 36/450	H075539	
	2.5 URGG 36/500	J075540	
	2.5 URGG 36/525	K075541	

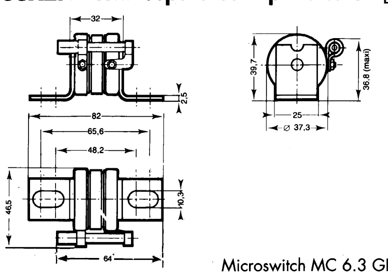
CP 36x27 - With built-in trip-indicator



Microswitch MC 36 GR 2.5 - Ref. P 092496

Size	Catalog Number	Ref. Number	Pack.
36x27	2.5 URGG 36 T 50	F080942	6 (910 g)
	2.5 URGG 36 T 75	G080943	
	2.5 URGG 36 T 100	H080944	
	2.5 URGG 36 T 125	W082382	
	2.5 URGG 36 T 150	V082381	
	2.5 URGG 36 T 200	T082380	
	2.5 URGG 36 T 250	S082379	
	2.5 URGG 36 T 300	R082378	
	2.5 URGG 36 T 350	Q082377	
	2.5 URGG 36 T 400	L075542	
	2.5 URGG 36 T 450	M075543	
	2.5 URGG 36 T 500	N075544	
	2.5 URGG 36 T 525	P075545	

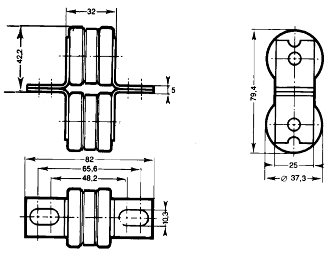
CP 36x27 - With separated trip-indicator BS88



Microswitch MC 6.3 GR 2.5 N - Ref. Y 310005

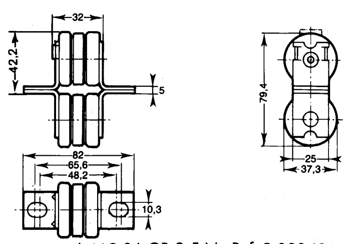
Size	Catalog Number	Ref. Number	Pack.
36x27	2.5 URGG 36 P 50	C080939	6 (970 g)
	2.5 URGG 36 P 75	D080940	
	2.5 URGG 36 P 100	E080941	
	2.5 URGG 36 P 125	Y081004	
	2.5 URGG 36 P 150	X081003	
	2.5 URGG 36 P 200	W081002	
	2.5 URGG 36 P 250	V081001	
	2.5 URGG 36 P 300	T081000	
	2.5 URGG 36 P 350	S080999	
	2.5 URGG 36 P 400	V075504	
	2.5 URGG 36 P 450	W075505	
	2.5 URGG 36 P 500	X075506	
	2.5 URGG 36 P 525	Y075507	

CP 2x36x27 - Without trip-indicator



Size	Catalog Number	Ref. Number	Pack.
2x36x27	2.5 URGH 236/300	K082464	3 (870 g)
	2.5 URGH 236/350	J082463	
	2.5 URGH 236/400	H082462	
	2.5 URGH 236/500	G082461	
	2.5 URGH 236/600	F082460	
	2.5 URGH 236/700	E082459	
	2.5 URGH 236/800	Q075546	
	2.5 URGH 236/900	R075547	
	2.5 URGH 236/1000	S075548	
	2.5 URGH 236/1050	T075549	

CP 2x36x27 - With built-in trip-indicator

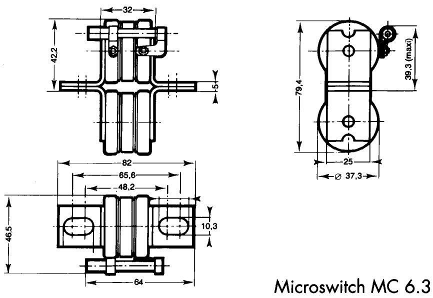


Microswitch MC 36 GR 2.5 N - Ref. P 092496 - See "microswitches" section

Size	Catalog Number	Ref. Number	Pack.
2x36x27	2.5 URGH 236 T 300	P082376	3 (870 g)
	2.5 URGH 236 T 350	N082375	
	2.5 URGH 236 T 400	M082374	
	2.5 URGH 236 T 500	L082373	
	2.5 URGH 236 T 600	K082372	
	2.5 URGH 236 T 700	J082371	
	2.5 URGH 236 T 800	V075550	
	2.5 URGH 236 T 900	R075501	
	2.5 URGH 236 T 1000	S075502	
	2.5 URGH 236 T 1050	T075503	

BS88 Fuses 250V

CP 2x36x27 - With separated trip-indicator BS88-4



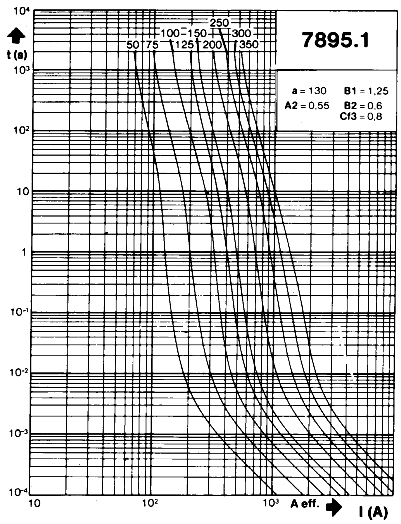
Microswitch MC 6.3 GR 2.5 N - Ref. Y 310005

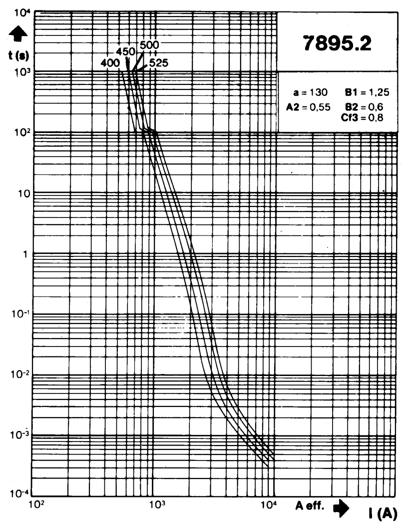
Size	Catalog Number	Ref. Number	Pack.
2x36x27	2.5 URGH 236 P 300	R080998	3 (900 g)
	2.5 URGH 236 P 350	Q080997	
	2.5 URGH 236 P 400	P080996	
	2.5 URGH 236 P 500	N080995	
	2.5 URGH 236 P 600	M080994	
	2.5 URGH 236 P 700	L080993	
	2.5 URGH 236 P 800	Z075508	
	2.5 URGH 236 P 900	A075509	
	2.5 URGH 236 P 1000	B075510	
	2.5 URGH 236 P 1050	C075511	

ELECTRICAL CHARACTERISTICS

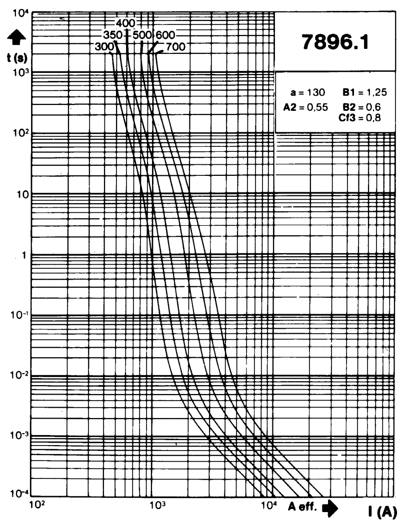
Times vs current characteristics

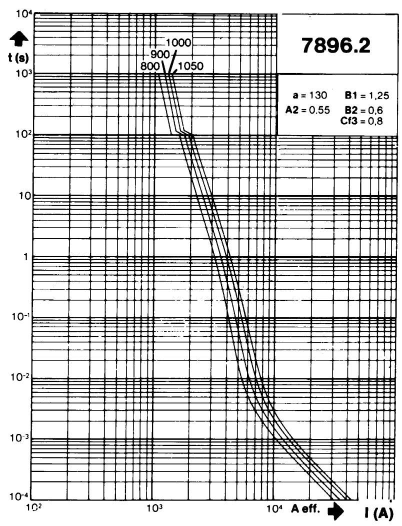
URGG





URGH



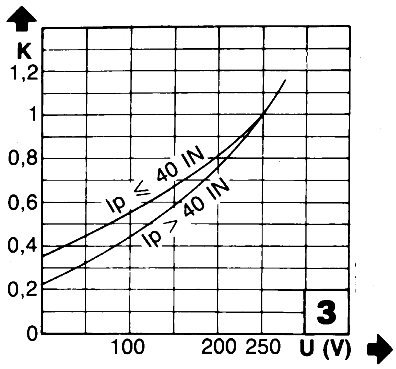


- *These curves indicate, for each rated current, the pre-arcing time vs. the R.M.S. pre-arcing current.*
- *Tolerance for the mean pre-arcing current ± 10%.*

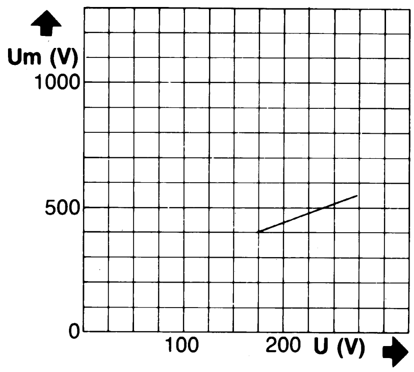
BS88 Fuses 250V

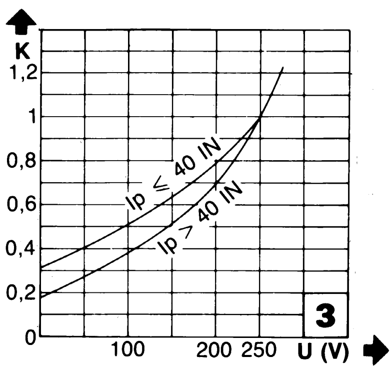
Corrective factor - Peak arc voltage

Corrective factor | **Peak arc voltage**

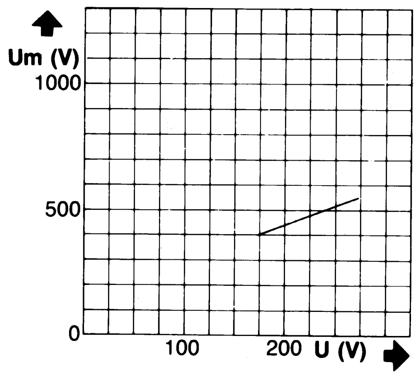


URGG
from 50 to 350 A
URGH
from 300 to 700 A





URGG
from 400 to 525 A
URGH
from 800 to 1050 A



Corrective factor :
The mean curves show the variation of the total clearing time (I^2t_t) as a function of operating voltage U.

Peak arc voltage :
This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of the operating voltage U @ cos φ = 0.15.

BS88 Fuses 660V

BRITISH STANDARD - 660 V
URE - URS - URT
From 5 to 160 A
Sizes 10x51 - 17x49 - 2x17x49

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 660 V VOLTAGE RATING COMPLYING WITH IEC 33
- GR CLASS (RATINGS FROM 5 TO 160 A) AS PER VDE 636-23 AND IEC 269.4
- TWO MODELS COMPLYING WITH BS 88-4
  - WITHOUT INDICATOR
  - WITH SEPARATE TRIP-INDICATOR
  (SIZES 17x49 AND 2x17x49)
- 17x49 fuses are UL Recognized c UR us



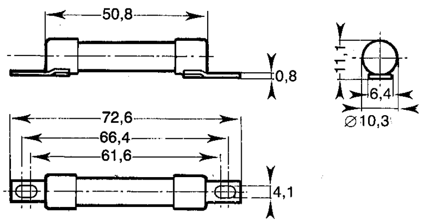
MAIN CHARACTERISTICS

Voltage rating U_N(V)	Size	Class	Current rating I_N(A)	pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ U_N A^2s		Watt losses		Tested interrupting rating
					$I_p \leq 50\ I_N$	$I_p > 50\ I_N$	$0.8\ I_N$	I_N	
660 V	10x51	URE	5	1.3	10	15	1.05	2	200 kA @ 660 V
			6	1.3	13.5	20.5	1.3	2.5	
			10	3.3	25	35	2.2	4.1	
			12	5.5	40	58	2.3	4.3	
			15	9.7	70	100	2.4	4.4	
			20	19.4	120	200	3.1	5.8	
	17x49	URS	16	9.7	75	107	2.7	4.8	200 kA @ 660 V
			20	17.3	130	185	2.9	5.3	
			25	27	200	285	3.7	6.7	
			32	53	400	570	4.7	8.6	
			35	70	510	725	5.2	9.6	
			40	98	760	1080	5.7	10.5	
			45	130	900	1280	6.2	11.4	
			50	156	1000	1420	6.8	12.6	
			55	210	1380	1970	7.2	13.3	
			63	315	2000	2850	7.5	13.9	
			75	525	3350	4630	7.8	14.4	
			80	625	3900	5700	8.5	15.8	
	2x17x49	URT	65	210	1590	2270	9.5	17.4	200 kA @ 660 V
			75	310	2300	3280	10.9	20	
			85	430	3050	4350	11.9	21.9	
			90	525	3600	5130	12.4	22.8	
			110	850	5500	7840	13.8	26.5	
			140	1730	11000	15700	15.5	28.5	
			150	2090	13400	18500	15.6	28.7	
			160	2500	15600	22800	16.9	31.5	

Minimum operating voltage for separate trip indicator = 20 V

BS88 Fuses — 660V

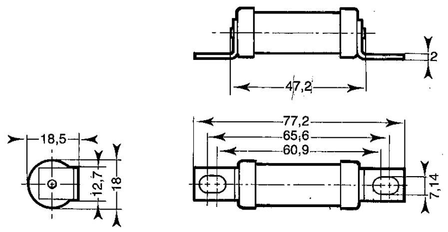
CP 10x51 - Without trip-indicator



**BS 88 part 4 indique respectivement Ø 8,7 et 8,8

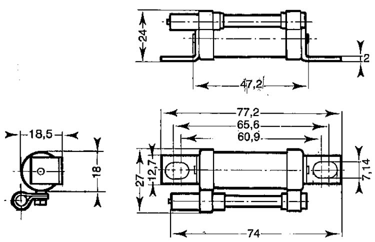
Size	Catalog Number	Ref. Number	Pack
10x51	6,6 URE 10/5	D 082458	10 (130 g)
	6,6 URE 10/6	X 097057	
	6,6 URE 10/10	C 082457	
	6,6 URE 10/12	Z 097059	
	6,6 URE 10/15	B 082456	
	6,6 URE 10/20	A 082455	

CP 17x49 - Without trip-indicator



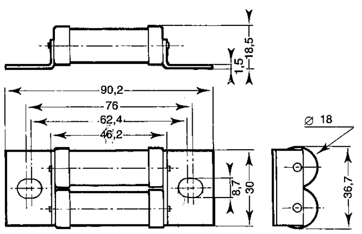
Size	Catalog Number	Ref. Number	Pack
17x49 c UL us	6,6 URS 17/16	G 075883	10 (510 g)
	6,6 URS 17/20	H 075884	
	6,6 URS 17/25	J 075885	
	6,6 URS 17/32	K 075886	
	6,6 URS 17/35	L 075887	
	6,6 URS 17/40	M 075888	
	6,6 URS 17/45	N 075889	
	6,6 URS 17/50	P 075890	
	6,6 URS 17/55	Q 075891	
	6,6 URS 17/63	R 075892	
	6,6 URS 17/75	S 075893	
	6,6 URS 17/80	T 075894	

CP 17x49 - With built-in trip-indicator



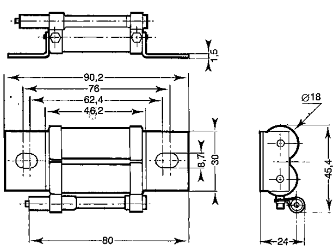
Size	Catalog Number	Ref. Number	Pack
17x49 c UL us	6,6 URS 17 P 16	V 075895	10 (610 g)
	6,6 URS 17 P 20	W 075896	
	6,6 URS 17 P 25	X 075897	
	6,6 URS 17 P 32	Y 075898	
	6,6 URS 17 P 35	Z 075899	
	6,6 URS 17 P 40	A 075900	
	6,6 URS 17 P 45	B 075901	
	6,6 URS 17 P 50	K 081084	
	6,6 URS 17 P 55	C 075902	
	6,6 URS 17 P 63	D 075903	
	6,6 URS 17 P 75	E 075904	
	6,6 URS 17 P 80	F 075905	

CP 2x17x49 - Without trip-indicator



Size	Catalog Number	Ref. Number	Pack
2x17x49	6,6 URT 217/65	G 075906	5 (530 g)
	6,6 URT 217/75	F 099572	
	6,6 URT 217/85	H 075907	
	6,6 URT 217/90	A 099958	
	6,6 URT 217/110	B 099959	
	6,6 URT 217/140	J 075908	
	6,6 URT 217/150	C 099960	
	6,6 URT 217/160	K 075909	

CP 2x17x49 -With built-in trip-indicator



Size	Catalog Number	Ref. Number	Pack
2x17x49	6,6 URT 217 P 65	L 075910	5 (580 g)
	6,6 URT 217 P 75	M 075911	
	6,6 URT 217 P 85	N 075912	
	6,6 URT 217 P 90	P 075913	
	6,6 URT 217 P 110	Q 075914	
	6,6 URT 217 P 140	R 075915	
	6,6 URT 217 P 150	S 075916	
	6,6 URT 217 P 160	T 075917	

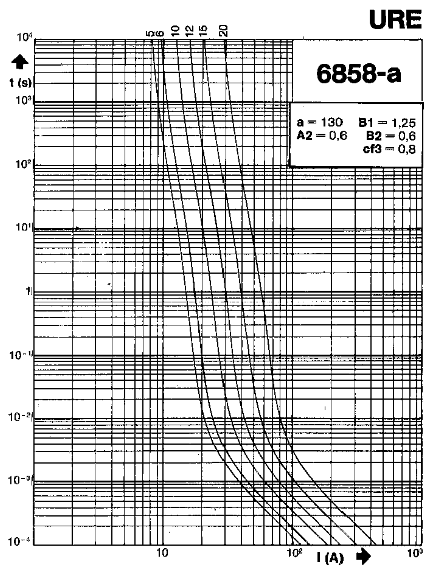
Microswitch MC6,3 GR 2-5N : Reference Number Y310015

See Fuse Blocks and Fuse Holders and Medium Voltage fuse clips

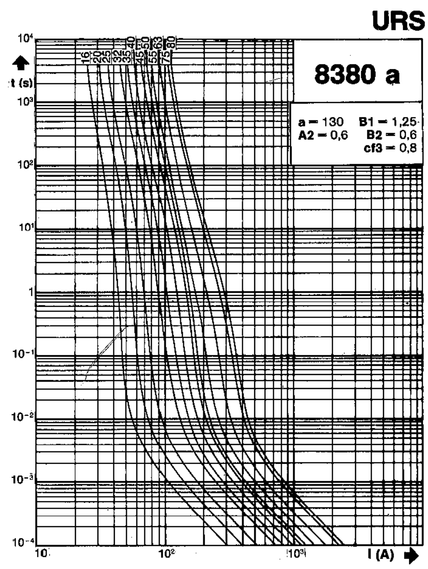
BS88 Fuses 660V

Time vs current characteristics

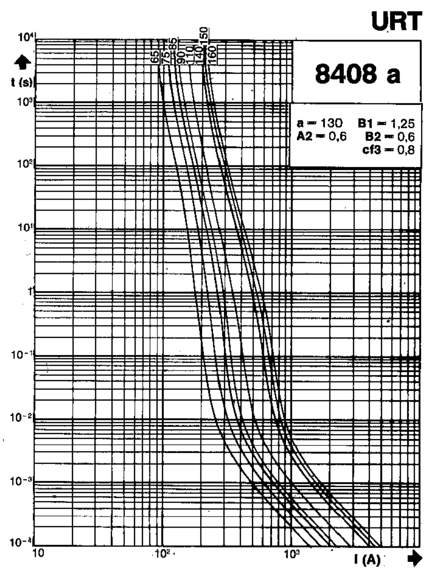
URE



URS



URT

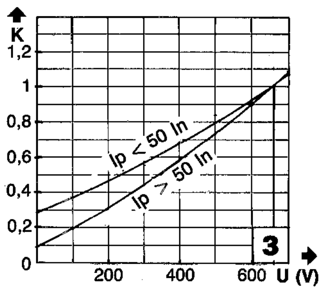


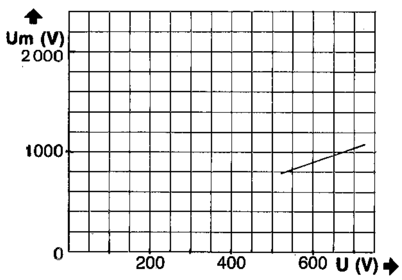
- *These curves indicate, for each rated current, the pre-arcing time vs. the R.M.S. pre-arcing current.*
- *Tolerance for the mean pre-arcing current ± 10%.*

Corrective factor - Peak arc voltage

Corrective factor

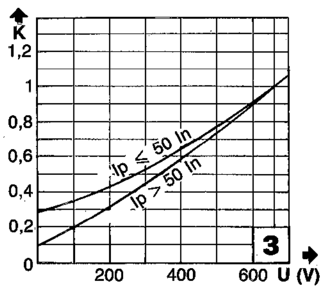
URE

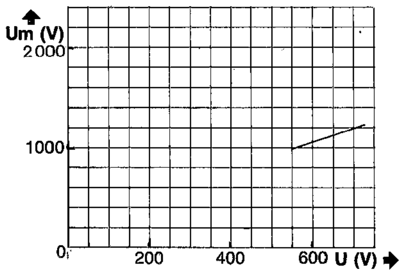




Peak arc voltage

URS
URT



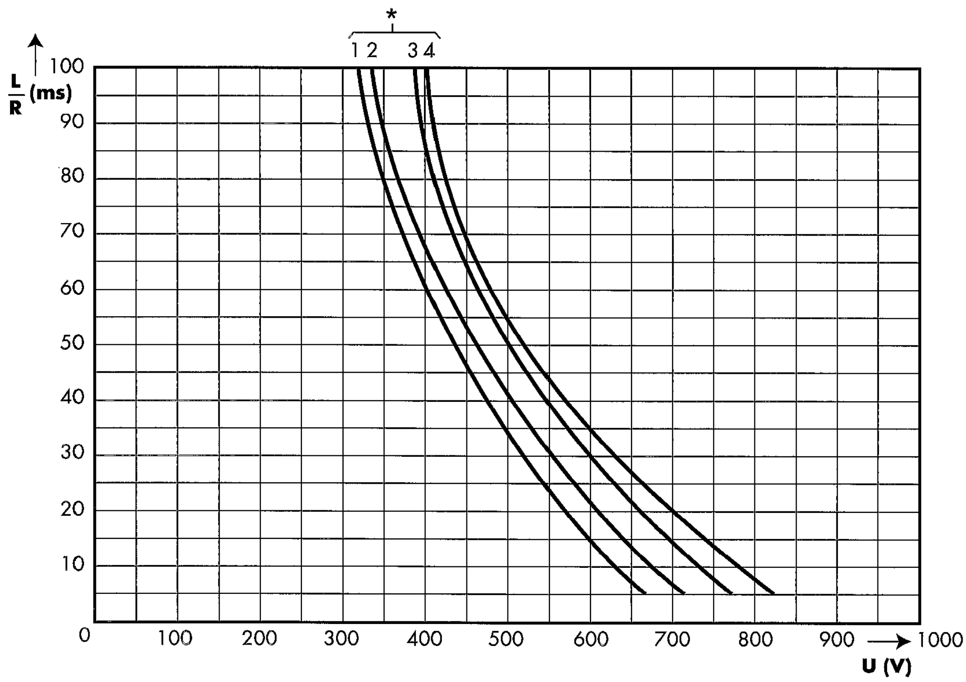


The mean curves show the variation of the total clearing time (I^2t_t) and the total clearing duration t_t as a function of operating voltage U.

This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of the operating voltage U @ cos φ = 0.15.

BS88 Fuses 660V

D.C. Applications data



- These curves indicate the permissible value of time constant L/R as a function of the D.C. working voltage.
- The Ipm values give the minimum DC interrupting current in amps.

Curves # and Ipm for each rating			
Class	Rated current	*	Ipm (A)
URE	5	4	40
	6	4	48
	10	4	60
	12	4	84
	15	4	112
	20	4	140
URS	16	3	96
	20	3	140
	25	3	175
	32	3	255
	35	3	300
	40	3	320
	45	3	335
	50	3	350
	55	3	365
	63	3	390
	75	2	425
	80	1	440
URT	65	3	510
	75	3	550
	85	3	590
	90	3	610
	110	3	685
	140	3	800
	150	2	840
	160	1	880

BS88 Fuses 660V

BRITISH STANDARD
500 - 660 V AC
gRB - URB from 20 to 400 A
Size: 000 BS88

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4, AND EN 60269-1.4
- 500- 660 V VOLTAGE RATING (RATING 20 TO 400 A)
- gR CLASS (gRB RATINGS 20 TO 125 A) ACCORDING TO VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVED SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION WITH ALL FUSES

  aR CLASS (URB RATINGS 75 TO 400 A) ACCORDING TO VDE 636-23 AND IEC 269.4
- TWO MODELS ACCORDING TO BS 88-4 AND EN 60 269 .4 STANDARDS; Z3 DRAWING (74 mm BETWEEN AXES) WITHOUT BLOWN FUSE INDICATION - WITH SEPARATE TRIP INDICATOR
- THESE FUSES ARE UL RECOGNIZED c UL us





MAIN CHARACTERISTICS

Voltage rating U_N(V)	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss		Tested interrupting rating	Estimated interrupting rating
					0.8 I_N	I_N		
660 690+6%	gRB	20	12	80	3.8	7	200 k A @ 660 V	300 k A @ 660 V
		25	20	150	5.0	9		
		32	39	270	5.5	10		
		40	70	460	6.6	12		
		50	102	730	7.7	14		
		63	210	1500	8.8	16		
		80	475	2900	9.9	18		
		100	970	6000	11	20		
		125	1900	11800	11.6	21		
660 690+6%	URB	75	350	2250	11.2	20.5	200 k A @ 660 V	300 k A @ 660 V
		80	390	2500	11.6	21		
		100	690	4200	12.7	23		
		110	950	6800	13.5	24.5		
		125	1300	8900	14.3	26		
		160	2700	16000	17.0	31		
		200	5250	31500	19.8	36		
		250	9900	52000	24.8	45		
		315	15500	82000	31.9	58		
500	URB	350	22400	110000	31.9	58	120 k A @ 500 V	
		400	33200	160000	36.3	66		

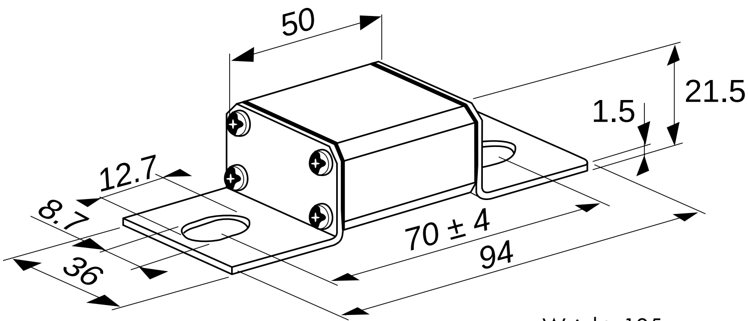
Minimum operating voltage for separate trip-indicator: 20 V

Ferraz Shawmut

BS88 Fuses — 660V

REFERENCES

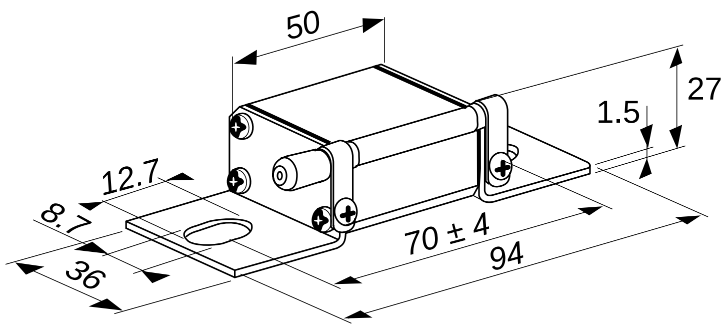
BRITISH STANDARD WITHOUT BLOWN FUSE INDICATOR



Weight: 125 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
20	6,6 gRB 000 BS88/020	T330044
25	6,6 gRB 000 BS88/025	V330045
32	6,6 gRB 000 BS88/032	W330046
40	6,6 gRB 000 BS88/040	X330047
50	6,6 gRB 000 BS88/050	Z330049
63	6,6 gRB 000 BS88/063	A330050
80	6,6 gRB 000 BS88/080	N330108
100	6,6 gRB 000 BS88/100	H330103
125	6,6 gRB 000 BS88/125	P330109
75	6,6 URB 000 BS88/075	B330051
80	6,6 URB 000 BS88/080	C330052
100	6,6 URB 000 BS88/100	D330053
110	6,6 URB 000 BS88/110	E330100
125	6,6 URB 000 BS88/125	E330054
150	6,6 URB 000 BS88/150	F330101
160	6,6 URB 000 BS88/160	F330055
200	6,6 URB 000 BS88/200	G330056
250	6,6 URB 000 BS88/250	H330057
315	6,6 URB 000 BS88/315	J330058
350	5 URB 000 BS88/350	X330116
400	5 URB 000 BS88/400	G330194

BRITISH STANDARD WITH SEPARATE BLOWN FUSE TRIP-INDICATOR



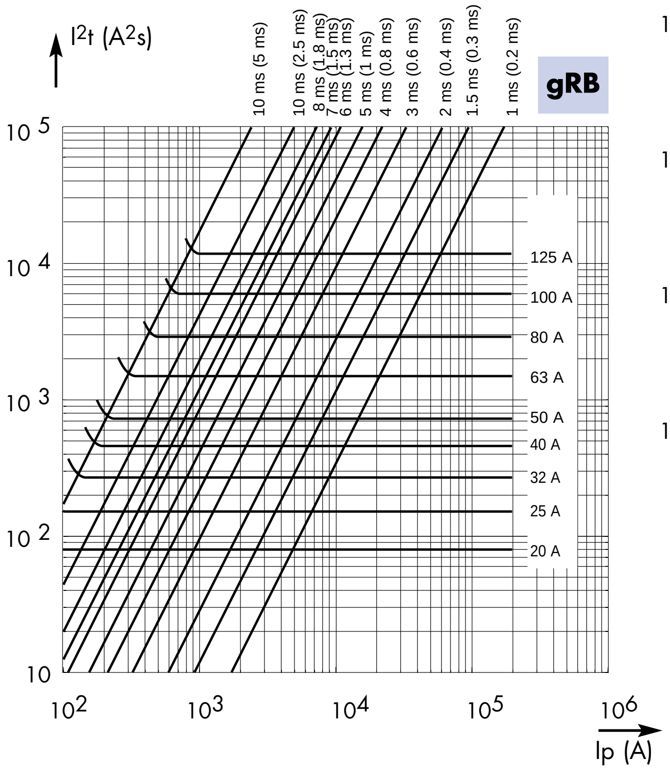
Weight: 135 g
Packaging: 10 pieces

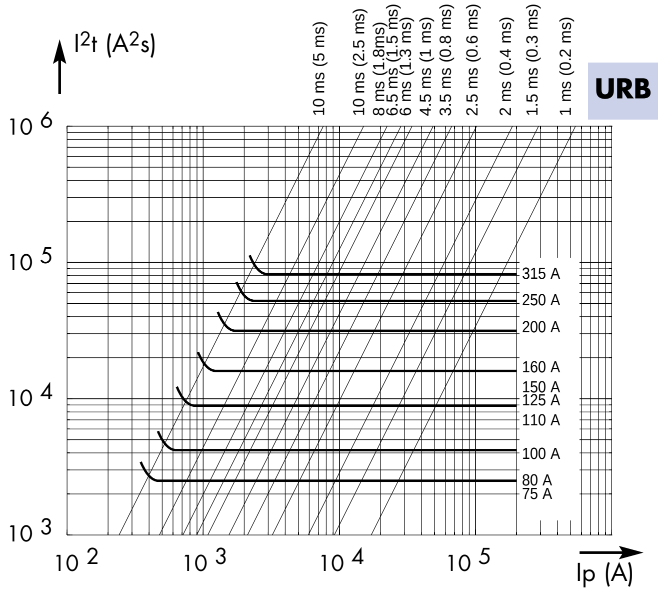
Current rating	Catalog Number	Ref. Number
20	6,6 gRB 000 BS88P/020	Y330117
25	6,6 gRB 000 BS88P/025	Z330118
32	6,6 gRB 000 BS88P/032	A330119
40	6,6 gRB 000 BS88P/040	B330120
50	6,6 gRB 000 BS88P/050	C330121
63	6,6 gRB 000 BS88P/063	D330122
80	6,6 gRB 000 BS88P/080	E330123
100	6,6 gRB 000 BS88P/100	F330124
125	6,6 gRB 000 BS88P/125	G330125
75	6,6 URB 000 BS88P/075	H330126
80	6,6 URB 000 BS88P/080	J330127
100	6,6 URB 000 BS88P/100	K330128
110	6,6 URB 000 BS88P/110	L330129
125	6,6 URB 000 BS88P/125	M330130
150	6,6 URB 000 BS88P/150	N330131
160	6,6 URB 000 BS88P/160	P330132
200	6,6 URB 000 BS88P/200	Q330133
250	6,6 URB 000 BS88P/250	R330134
315	6,6 URB 000 BS88P/315	S330135
350	5 URB 000 BS88P/350	T330136
400	5 URB 000 BS88P/400	H330195

The use of MC 6.3 GR 2-5N blown fuse remote sensing microswitch is possible.
Ref. Number : Y 310015 mounted on separate trip-indicator.
See Microswitch section page 421

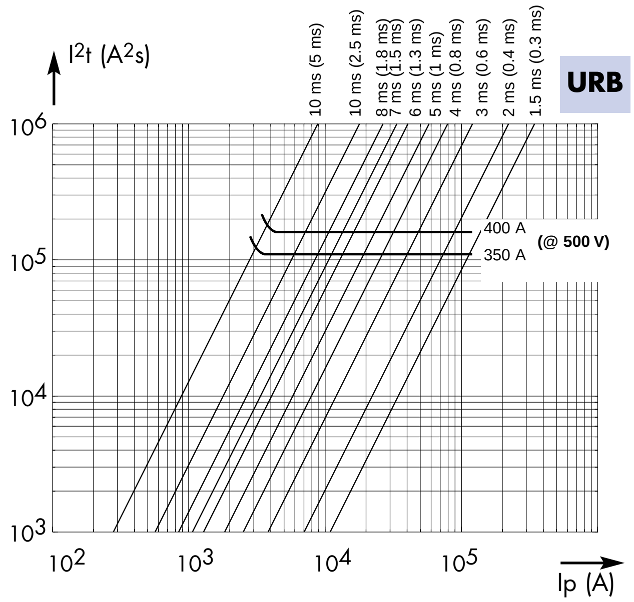
BS88 Fuses 660V

Total clearing I²t

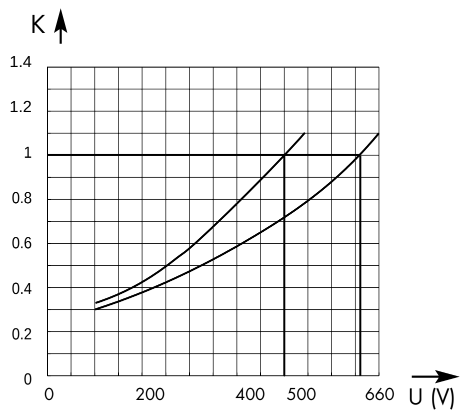




Above: Horizontal curves show, for each rated current, maximum values of total clearing I²t (I^2t_t) as a function of prospective current Ip. @ U_N with cosj = 0.15.
Oblique lines indicate total clearing duration Tt, with associated pre-arcing duration in brackets.

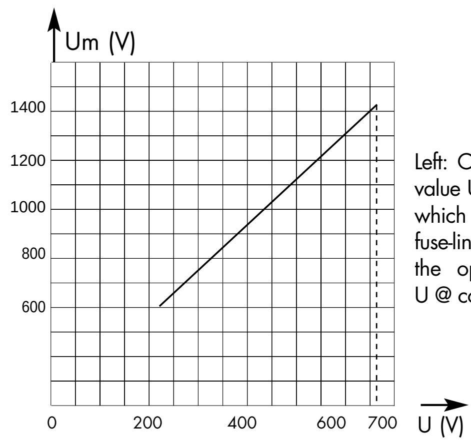


I²t corrective factor



Above: Mean curves show variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.

Peak arc voltage

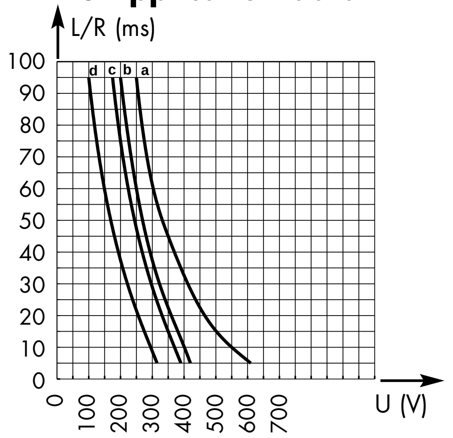


Left: Curve shows peak value Um of arc voltage which appears across fuse-link as a function of the operating voltage U @ cos φ = 0.15

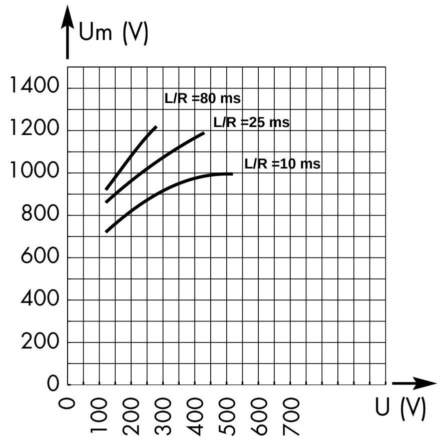
BS88 Fuses

660

DC Application data



Above: curves indicate permissible value of time constant L/R as a function of DC working voltage.
Curve a: for ratings from 20 to 160 A
Curve b : for ratings from 180 to 200 A
Curve c : for ratings from 250 to 315 A
Curve d : for ratings from 350 to 400 A



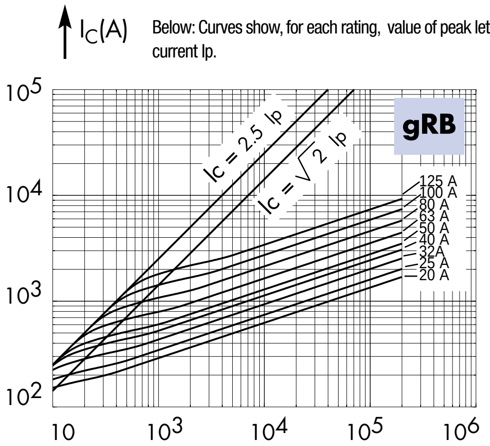
Above: Curves indicate peak arc voltage Um which may appear across the fuse terminals at working voltage U.

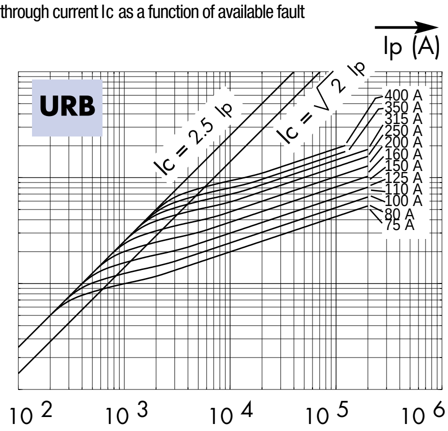
Rated current	Curve	Ipm (A)
20	a	60
25	a	65
32	a	90
40	a	120
50	a	150
63	a	200
80	a	270
100	a	370
125	a	500
160	a	700
200	b	1200
250	c	1800
315	c	2200
350	d	2600
400	d	3100

Ipm values give minimum DC interrupting current in amps.

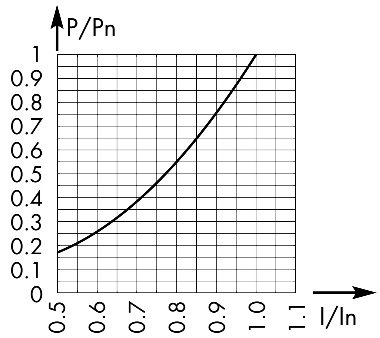
Current limitation curves

Below: Curves show, for each rating, value of peak let-through current Ic as a function of available fault current Ip.



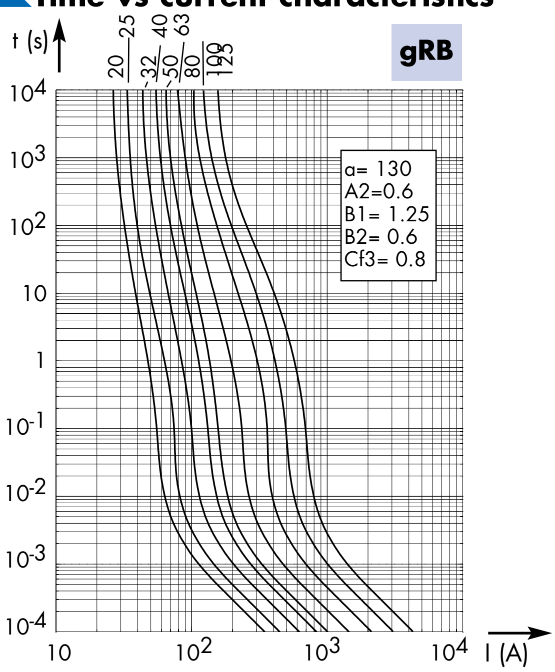


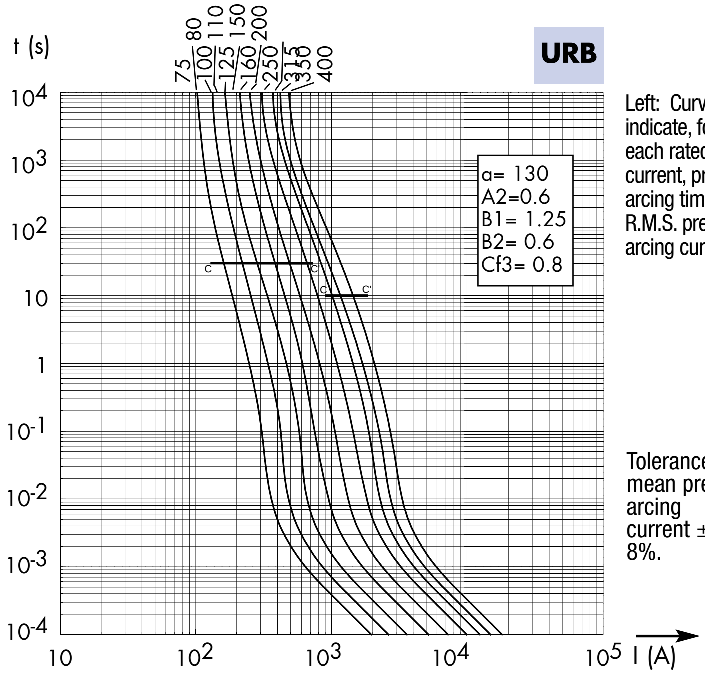
Watts loss



Above: Curve enables computation of power losses P for a I_N-rated fuse as a function of the R.M.S. current I (as a multiple of I_N for steady state operation)

Time vs current characteristics





Left: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Tolerance for mean pre-arcing current ± 8%.

BS88 Fuses 660V

BRITISH STANDARD
660 V AC
gRB-URC-URD from 50 to 500 A
Sizes : 000 and 2.000 BS88Z

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 660 V VOLTAGE RATING (RATINGS 50 TO 500 A)
- gR CLASS (gRB RATINGS 50 AND 65 A) COMPLYING WITH VDE 636-23
  - CLEARING ALL OVERLOADS
  - IMPROVED SAFETY AND PROTECTION
  - ENABLING SELECTIVE COORDINATION WITH ALL FUSES

  aR CLASS (URC AND URD RATINGS 75 TO 500 A) ACCORDING TO VDE 636-23 AND IEC 269.4
- FOUR MODELS: SINGLE AND TWIN BODY AS PER BS 88-4 STANDARD ; Z2 DRAWING (92 mm BETWEEN AXES) WITHOUT BLOWN FUSE INDICATOR - WITH SEPARATE TRIP-INDICATOR
- THESE FUSES ARE UL RECOGNIZED c UR US





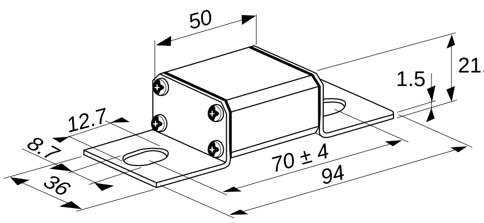
MAIN CHARACTERISTICS

Voltage rating U_N (V)	Size	Class	Current rating I_N(A)	Pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ UN I^2t_t (A^2s)	Watts loss 0.8 I_N	Watts loss I_N	Tested interrupting rating	Estimated interrupting rating
660	000	gRB	50	102	730	7.7	14		
			65	210	1500	8.8	16		
		URC URD	75	390	2500	9.4	17	200 k A @ 660 V	300 k A @ 660 V
			85	540	3300	10.5	19		
			90	690	4200	13.2	24		
			110	1300	8900	13.8	25		
			150	2700	16000	14.3	26		
			180	5250	31500	14.9	27		
			200	9900	52000	15.4	28		
			250	15500	82000	17.6	32		
			280	15500	82000	23.7	43		
	2.000	URC URD	175	2760	16800	18.2	33	200 k A @ 660 V	300 k A @ 660 V
			200	3800	25000	20.4	37		
			235	5200	35600	24.2	44		
			300	10800	64000	28.6	52		
			325	15400	92400	29.1	53		
			355	21000	126000	29.7	54		
			400	39600	208000	30.8	56		
			450	40000	210000	33	60		
			500	62000	328000	35.2	64		

Minimum operating voltage for separate trip-indicator: 20 V

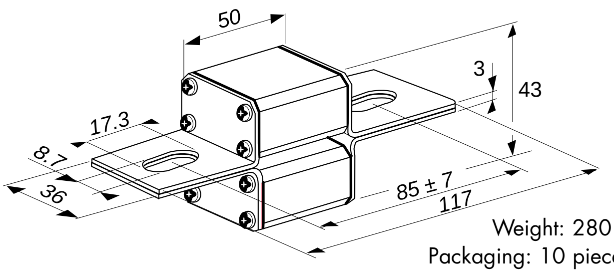
BS88 Fuses 660V

BRITISH STANDARD WITHOUT BLOWN FUSE INDICATOR



Weight: 140 g
Packaging: 10 pieces

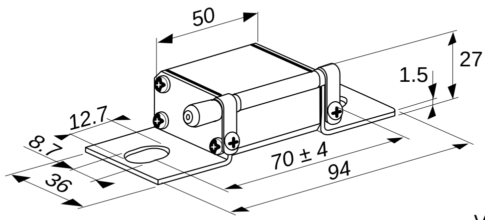
Current rating	Catalog Number	Ref. Number
50	6,6 gRB 000 BS88Z/050	V330137
65	6,6 gRB 000 BS88Z/065	W330138
75	6,6 URC 000 BS88Z/075	X330139
85	6,6 URC 000 BS88Z/085	Y330140
90	6,6 URC 000 BS88Z/090	Z330141
110	6,6 URC 000 BS88Z/110	A330142
150	6,6 URC 000 BS88Z/150	B330143
180	6,6 URC 000 BS88Z/180	C330144
200	6,6 URD 000 BS88Z/200	D330145
250	6,6 URD 000 BS88Z/250	E330146
280	6,6 URC 000 BS88Z/280	F330147



Weight: 280 g
Packaging: 10 pieces

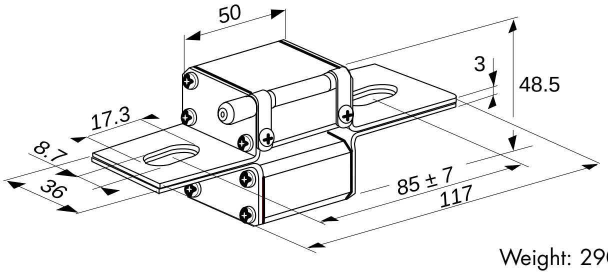
Current rating	Catalog Number	Ref. Number
175	6,6 URC 2000 BS88Z/175	P330155
200	6,6 URC 2000 BS88Z/200	Q330156
235	6,6 URC 2000 BS88Z/235	R330157
300	6,6 URC 2000 BS88Z/300	S330158
325	6,6 URC 2000 BS88Z/325	T330159
355	6,6 URC 2000 BS88Z/355	V330160
400	6,6 URD 2000 BS88Z/400	W330161
450	6,6 URC 2000 BS88Z/450	X330162
500	6,6 URD 2000 BS88Z/500	Y330163

BRITISH STANDARD WITH SEPARATE BLOWN FUSE TRIP-INDICATOR



Weight: 150 g
Packaging: 10 pieces

Current rating	Catalog Number	Ref. Number
90	6,6 URC 000 BS88ZP/090	G330148
110	6,6 URC 000 BS88ZP/110	H330149
150	6,6 URC 000 BS88ZP/150	J330150
180	6,6 URC 000 BS88ZP/180	K330151
200	6,6 URD 000 BS88ZP/200	L330152
250	6,6 URD 000 BS88ZP/250	M330153
280	6,6 URC 000 BS88ZP/280	N330154



Weight: 290 g
Packaging: 10 pieces

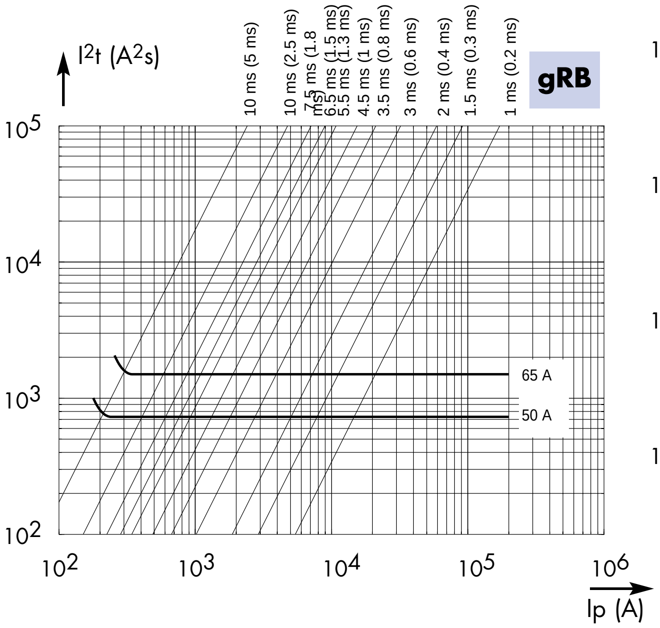
Current rating	Catalog Number	Ref. Number
175	6,6 URC 2000 BS88ZP/175	Z330164
200	6,6 URC 2000 BS88ZP/200	A330165
235	6,6 URC 2000 BS88ZP/235	B330166
300	6,6 URC 2000 BS88ZP/300	C330167
325	6,6 URC 2000 BS88ZP/325	D330168
355	6,6 URC 2000 BS88ZP/355	E330169
400	6,6 URC 2000 BS88ZP/400	F330170
450	6,6 URC 2000 BS88ZP/450	G330171
500	6,6 URC 2000 BS88ZP/500	H330172

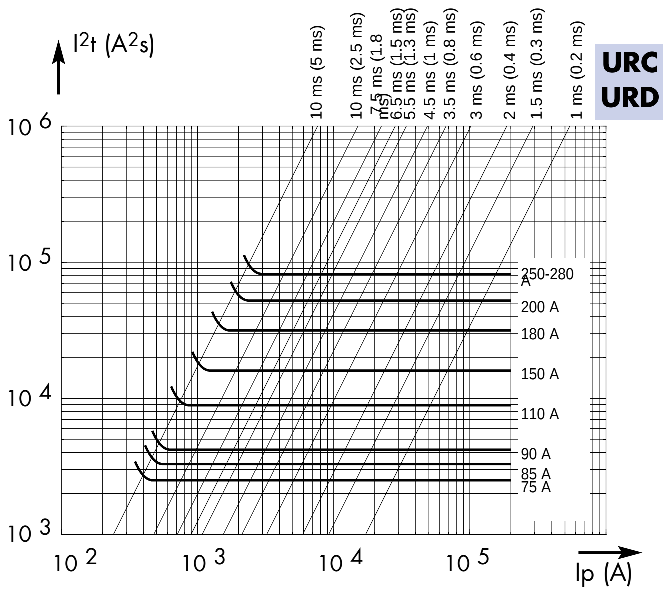
The use of MC 6.3 GR 2-5N blown fuse remote sensing microswitch is possible. Ref. Number: Y 310015 mounted on separate trip-indicator (see page 422).

See Fuse Blocks and Fuse Holders section and Medium Voltage fuse clips

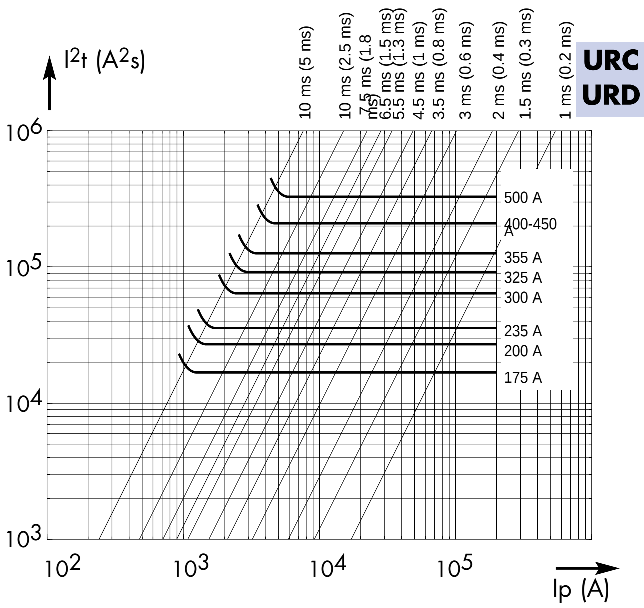
BS88 Fuses 660V

Total clearing I²t

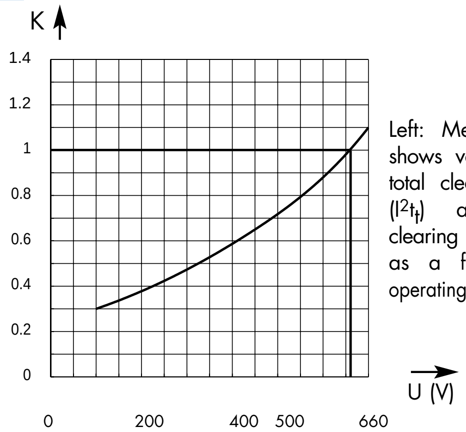




Above and right: Horizontal curves show, for each rated current, maximum values of total clearing I²t (I^2t_t) as a function of prospective current Ip @ U_N with cosj = 0.15. Oblique lines indicate total clearing duration Tt, with associated pre-arcing duration in brackets.

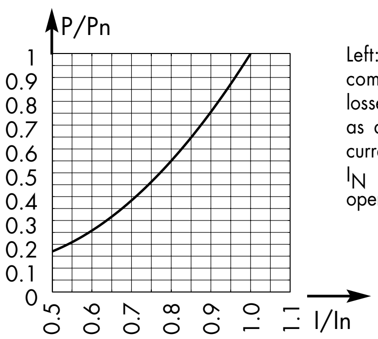


I²t corrective factor



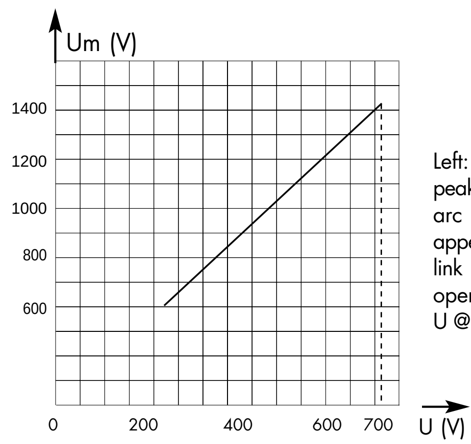
Left: Mean curve shows variation of total clearing time (I^2t_t) and total clearing duration Tt as a function of operating voltage U.

Watts loss



Left: Curve enables computation of power losses P for I_N-rated fuse as a function of R.M.S. current I (as a multiple of I_N for steady state operation)

Peak arc voltage



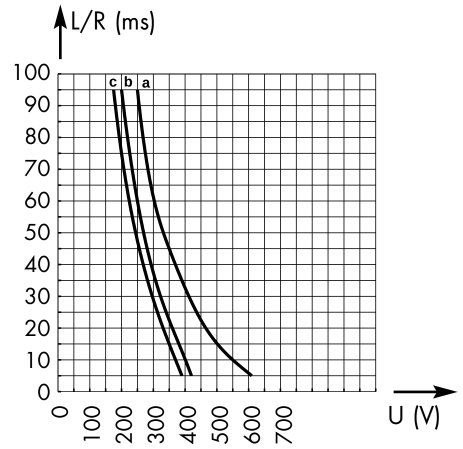
Left: Curve shows peak value Um of the arc voltage which appears across fuse-link as a function of operating voltage U @ cos φ = 0.15

Semiconductor Fuses

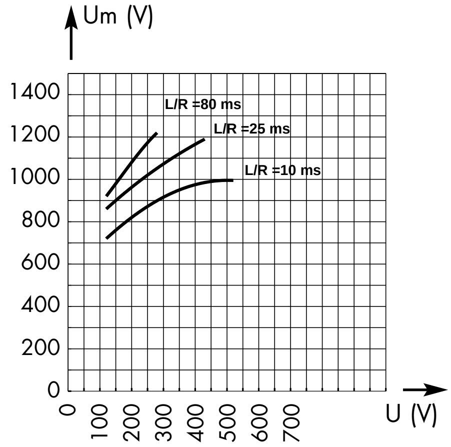
European Fuses

BS88 Fuses 660V

DC Application data



Above: Curves indicate permissible value of time constant L/R as a function of DC working voltage.
Curve a: Ratings from 175 to 300 A
Curve b: Rating 325 A
Curve c: Ratings from 355 to 500 A



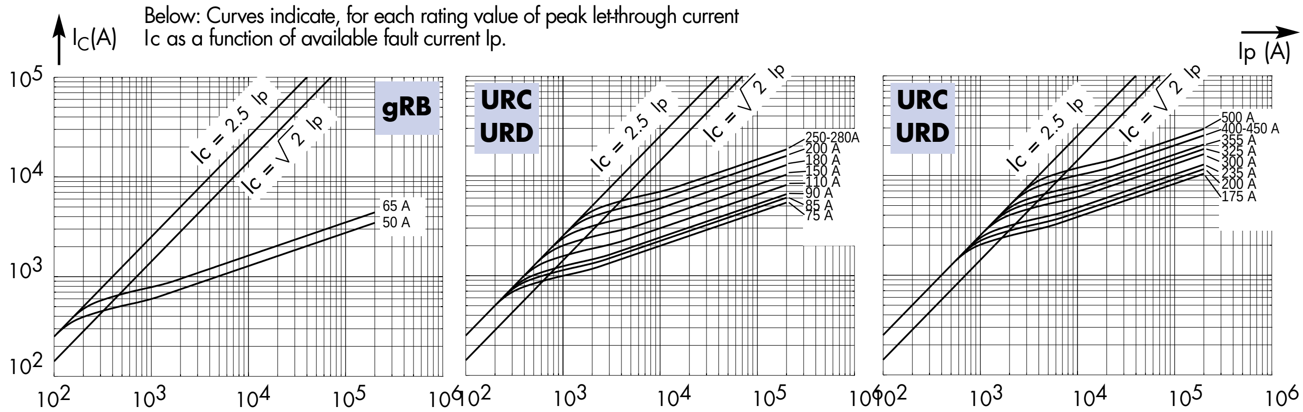
Above: Curves indicate peak arc voltage Um which may appear across fuse terminals at working voltage U.

Rated current	Curve	Ipm (A)
50	a	150
65	a	200
75	a	270
85	a	350
90	a	370
110	a	500
150	a	700
180	b	1200
200	c	1800
250	c	2200
280	c	2200
175	a	740
200	a	870
235	a	1000
300	a	1400
325	b	1900
355	b	2400
400	c	3600
450	c	4400
500	c	4400

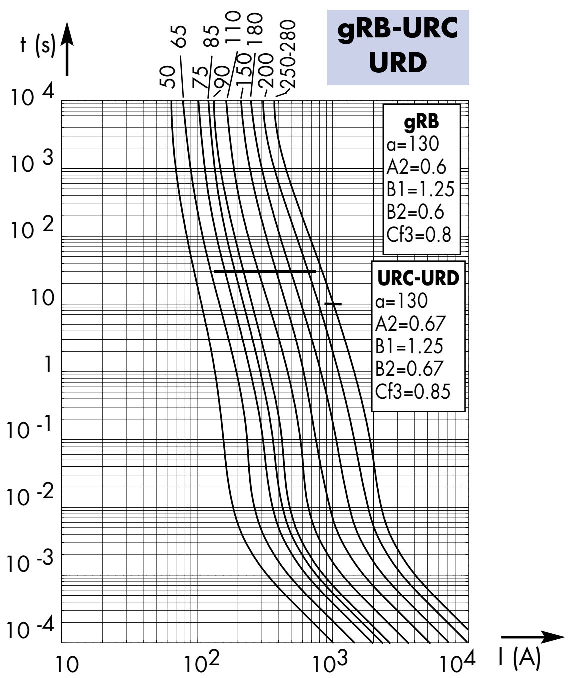
Ipm values give minimum DC interrupting current in amps.

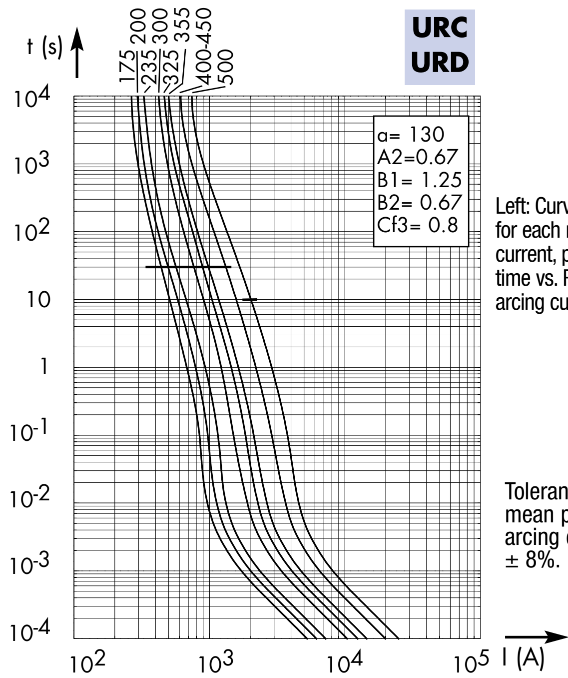
Current limitation curves

Below: Curves indicate, for each rating value of peak let-through current Ic as a function of available fault current Ip.



Time vs current characteristics





Left: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Tolerance for mean pre-arcing current ± 8%.

BS88 Fuses 660V

BRITISH STANDARD - 660 V
URR - URGL - URU - URGK
From 75 to 800 A
Sizes 36 x 55 - 2 x 36 x 55

- EXTREMELY HIGH INTERRUPTING RATING FUSES: PROTECTION OF POWER SEMICONDUCTORS AS PER IEC STANDARD 269.1 AND 4
- 660 V VOLTAGE RATING COMPLYING WITH IEC 33
- AR CLASS (RATINGS FROM 75 TO 800 A) AS PER VDE 636-23 AND IEC 269.4
- THREE MODELS COMPLYING WITH BS 88-4
  - WITHOUT INDICATOR
  - WITH SEPARATE TRIP-INDICATOR
  - WITH BUILT-IN TRIP-INDICATOR



MAIN CHARACTERISTICS

Voltage rating U_N (V)	Size	Class	Current rating I_N (A)	pre-arcing I^2t @ 1 ms I^2t_p (A^2s)	Total clearing I^2t @ U_N A^2s $I_p \leq 50\ I_N$	$I_p > 50\ I_N$	Watt losses $0.8\ I_N$	I_N	Tested interrupting rating
660 V	36x55	URR	75	350	1800	2000	9.7	19.5	200 kA @ 660 V
			110	1180	6000	6700	11.3	22.8	
			200	3900	18500	20500	21.8	41.4	
			250	8760	41000	46000	23.6	44.1	
		URGL	50	180	860	990	7.3	14.0	200 kA @ 660 V
			65	335	1600	1840	8.8	17.1	
			85	480	3450	4000	12.2	23.5	
			90	720	4100	4700	13.2	25.5	
			150	2880	12600	14500	18.9	35.3	
			180	5350	22500	25500	19.1	35.7	
			200	9510	40000	46000	17.7	33.1	
			250	21400	97000	110000	18.7	34.5	
			280	29100	125000	145000	20.3	38.0	
			315	38100	157000	180000	22.7	42.6	
			355	48200	190000	215000	25.9	48.5	
			400	72000	265000	305000	26.7	50.0	
	2x36x55	URU	200	4700	24000	27000	18.4	33.0	200 kA @ 660 V
			235	6920	34500	39000	21.0	37.6	
			400	21200	100000	110000	34.8	62.3	
			500	35000	164000	184000	47.2	88.2	
			630	97300	515000	575000	41.1	73.2	
		URGM	175	2880	13800	16000	24.7	47.6	200 kA @ 660 V
			300	13700	60000	68000	31.5	59.0	
			325	21400	90000	102000	30.0	54.0	
			355	25200	106000	120000	33.1	62.0	
			450	65600	300000	340000	34.6	63.8	
			500	85600	390000	440000	37.4	69.0	
			630	152000	630000	720000	45.4	85.2	
			710	193000	760000	860000	51.8	97.0	
			800	282000	$1.06\ 10^6$	$1.22\ 10^6$	53.4	100.0	

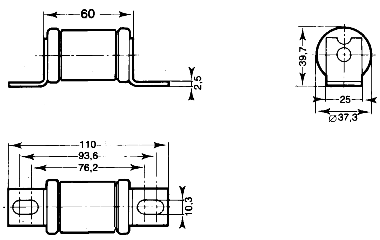
Minimum operating voltage for built-in and separate trip indicator = 20 V

Ferraz Shawmut

BS88 Fuses 660V

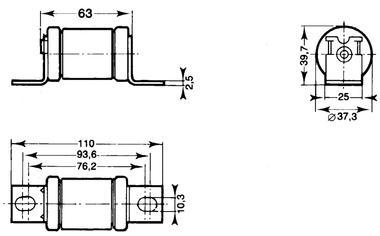
Ref. Numbers

CP 36x55 - Without trip-indicator



Size	Catalog Number	Ref. Number	Pack.
36x55	6.6 URGL 36/50	X097103	6 (1240 g)
	6.6 URGL 36/65	H097113	
	6.6 URR 36/75	H097136	
	6.6 URGL 36/85	M097163	
	6.6 URGL 36/90	N097164	
	6.6 URR 36/110	P097165	
	6.6 URGL 36/150	Q097166	
	6.6 URGL 36/180	R097167	
	6.6 URR 36/200	S097168	
	6.6 URGL 36/200	T097169	
	6.6 URR 36/250	V097170	
	6.6 URGL 36/250	W097171	
	6.6 URGL 36/280	A097175	
	6.6 URGL 36/315	B097176	
	6.6 URGL 36/355	C097177	
	6.6 URGL 36/400	D097178	

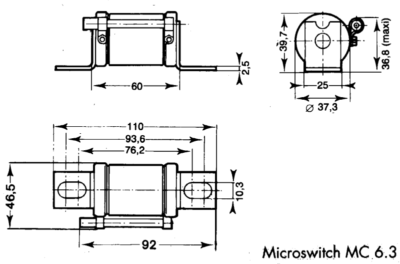
CP 36x55 - With built-in trip-indicator



Microswitch MC 36 GR 2.5 N - Ref. P 092496

Size	Catalog Number	Ref. Number	Pack.
36x55	6.6 URGL 36 T 50	N097210	6 (1240 g)
	6.6 URGL 36 T 65	K097230	
	6.6 URR 36 T 75	H099965	
	6.6 URGL 36 T 85	M097255	
	6.6 URGL 36 T 90	N097256	
	6.6 URR 36 T 110	R099973	
	6.6 URGL 36 T 150	Z082178	
	6.6 URGL 36 T 180	P097257	
	6.6 URR 36 T 200	A085560	
	6.6 URGL 36 T 200	R097259	
	6.6 URR 36 T 250	W097263	
	6.6 URGL 36 T 250	X097264	
	6.6 URGL 36 T 280	Y097265	
	6.6 URGL 36 T 315	Z097266	
	6.6 URGL 36 T 355	A097267	
	6.6 URGL 36 T 400	C097269	

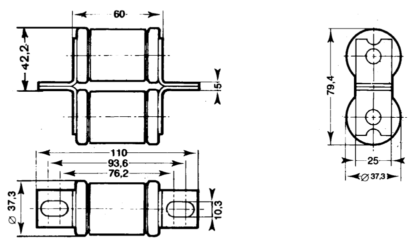
CP 36x55 - With separated trip-indicator BS88-4



Microswitch MC 6.3 GR 2.5 N - Ref. Y 310015

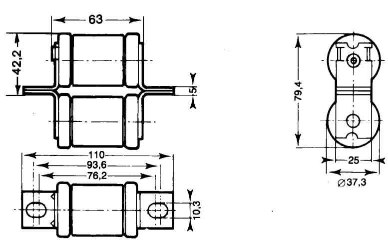
Size	Catalog Number	Ref. Number	Pack.
36x55	6.6 URGL 36 P 90	H097182	6 (1300 g)
	6.6 URR 36 P 110	J097183	
	6.6 URGL 36 P 150	K097184	
	6.6 URGL 36 P 180	L097185	
	6.6 URR 36 P 200	M097186	
	6.6 URGL 36 P 200	N097187	
	6.6 URR 36 P 250	P097188	
	6.6 URGL 36 P 250	Q097189	
	6.6 URGL 36 P 280	R097190	
	6.6 URGL 36 P 315	V097193	
	6.6 URGL 36 P 355	Y097196	
	6.6 URGL 36 P 400	M097209	

CP 2x36x55 - Without trip-indicator



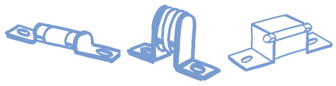
Size	Catalog Number	Ref. Number	Pack.
2x36x55	6.6 URGM 236/175	D097270	3 (1200 g)
	6.6 URU 236/200	F097272	
	6.6 URU 236/235	J097275	
	6.6 URGM 236/300	K097276	
	6.6 URGM 236/325	R097282	
	6.6 URGM 236/355	S097283	
	6.6 URU 236/400	T097284	
	6.6 URGM 236/450	Y097288	
	6.6 URGM 236/500	Z097289	
	6.6 URU 236/500	A097290	
	6.6 URGM 236/630	B097291	
	6.6 URU 236/630	R097351	
	6.6 URGM 236/710	S097352	
	6.6 URGM 236/800	Y097357	

CP 2x36x55 - With built-in trip-indicator



Microswitch MC 36 GR 2.5 N - Ref. P 092496

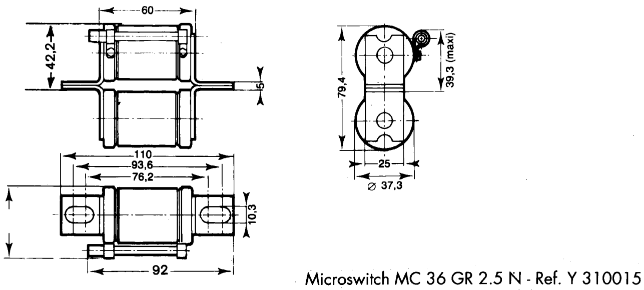
Size	Catalog Number	Ref. Number	Pack.
2x36x55	6.6 URGM 236 T 175	F097456	3 (1200 g)
	6.6 URU 236 T 200	G097457	
	6.6 URU 236 T 235	A082179	
	6.6 URGM 236 T 300	S085553	
	6.6 URGM 236 T 325	J097459	
	6.6 URGM 236 T 355	N097463	
	6.6 URU 236 T 400	P097464	
	6.6 URGM 236 T 450	Q097465	
	6.6 URGM 236 T 500	R097466	
	6.6 URU 236 T 500	S097467	
	6.6 URGM 236 T 630	V097469	
	6.6 URU 236 T 630	W097470	
	6.6 URGM 236 T 710	C097476	
	6.6 URGM 236 T 800	D097477	



European Fuses

BS88 Fuses 660V

CP 2x36x55 - With separated trip-indicator BS88-4



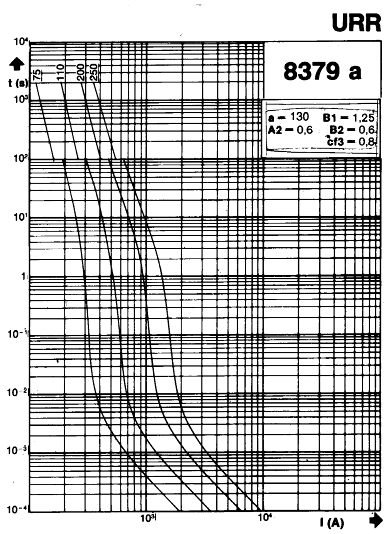
Microswitch MC 36 GR 2.5 N - Ref. Y 310015

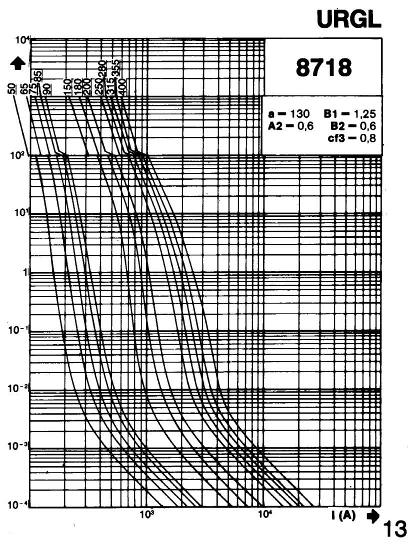
Size	Catalog Number	Ref. Number	Pack
2x36x55	6.6 URGM 236 P 175	A097359	3 (1230 g)
	6.6 URU 236 P 200	E097363	
	6.6 URU 236 P 235	F097364	
	6.6 URGM 236 P 300	G097365	
	6.6 URGM 236 P 325	Q097373	
	6.6 URGM 236 P 355	R097374	
	6.6 URU 236 P 400	S097375	
	6.6 URGM 236 P 450	T097376	
	6.6 URU 236 P 500	V097377	
	6.6 URGM 236 P 500	E097386	
	6.6 URU 236 P 630	J097390	
	6.6 URGM 236 P 630	P097395	
	6.6 URGM 236 P 710	B097452	
	6.6 URGM 236 P 800	E097455	

ELECTRICAL CHARACTERISTICS

Times vs current characteristics

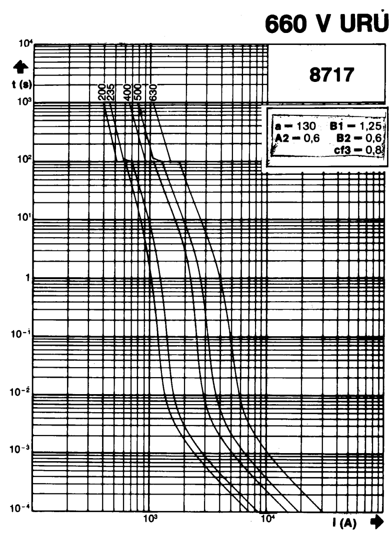
- *These curves indicate, for each rated current, the pre-arcing time vs. the R.M.S. pre-arcing current.*

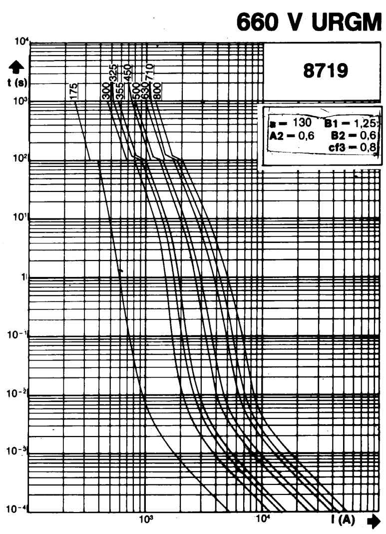




13

- *Tolerance for the mean pre-arcing current ± 10%.*

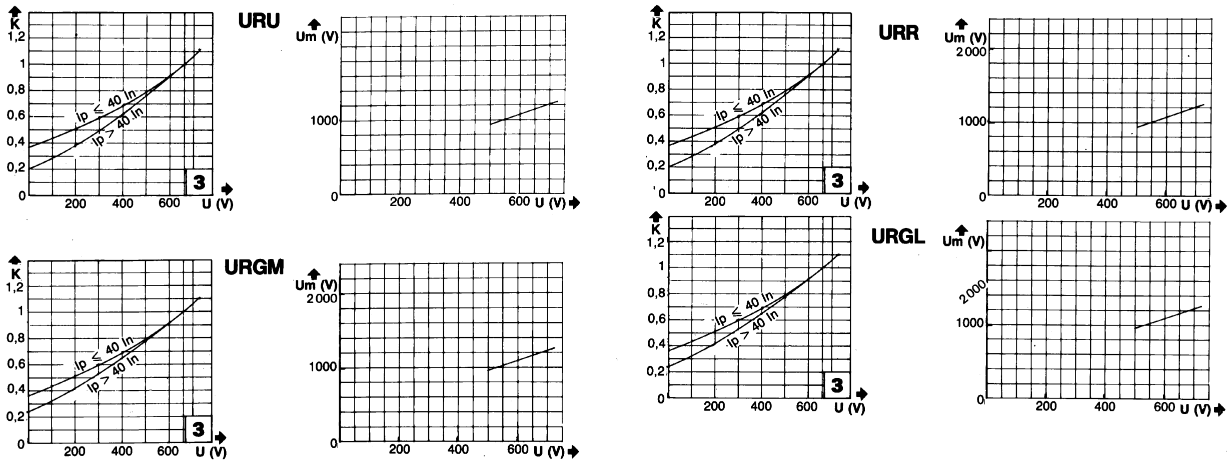




BS88 Fuses 660V

Corrective factor - Peak arc voltage

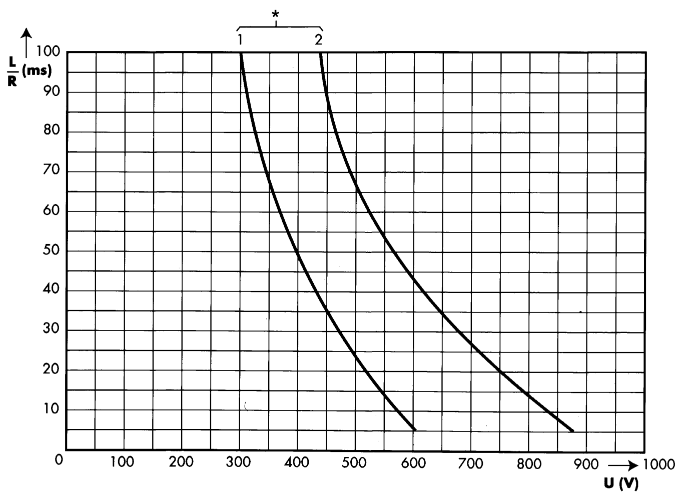
Corrective factor	Peak arc voltage	Corrective factor	Peak arc voltage



Corrective factor:
The mean curves show the variation of the total clearing time (I^2t_t) and the total clearing duration t_t as a function of operating voltage U.

Peak arc voltage:
This curve shows the peak value Um of the arc voltage which appears across the fuse link as a function of the operating voltage U @ cos φ = 0.15.

D.C. Applications data



Curves # and Ipm for each rating			
Class	Rated current	*	Ipm (A)
URR	75	2	225
	110	2	330
	200	2	600
	250	2	750
URU	200	2	600
	235	2	700
	400	2	1200
	500	2	1500
	630	1	1890

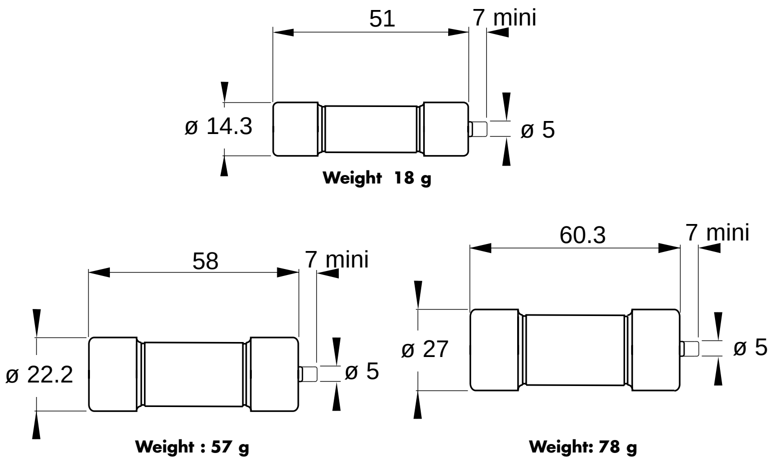
- These curves indicate the permissible value of time constant L/R as a function of the D.C. working voltage.
- The Ipm values give the minimum DC interrupting current in amps.

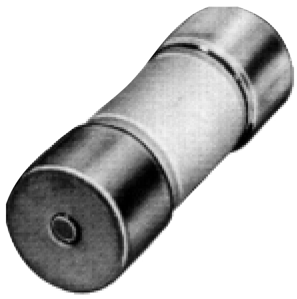
Ferrule Fuses

440V DC

440 V DC
gLB from 2 to 160 A
Sizes 14x51, 22x58, 27x60

Dimensions





Trip force: 4.5N at 0 mm - 2.5N at 7mm

MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref. Number	Pack.
14x51	2	@ 440 V DC 100 kA L/R = 30 ms	0.29	0.5	CC 4.421 CP gLB 14x51/2	E075720	10 pieces
	6		0.74	1.3	CC 4.421 CP gLB 14x51/6	Q094084	
	8		1.1	1.8	CC 4.421 CP gLB 14x51/8	F075721	
	10		1.1	1.9	CC 4.421 CP gLB 14x51/10	G075722	
	12		1.2	2.0	CC 4.421 CP gLB 14x51/12	R094085	
	16		1.2	2.1	CC 4.421 CP gLB 14x51/16	H075723	
	20		1.4	2.5	CC 4.421 CP gLB 14x51/20	L221132	
	25		1.6	2.8	CC 4.421 CP gLB 14x51/25	J075724	
	32		2.4	4.2	CC 4.421 CP gLB 14x51/32	S098410	
	40		2.9	5.0	CC 4.421 CP gLB 14x51/40	T098687	
	50		3.3	5.7	CC 4.421 CP gLB 14x51/50	H076620	
22x58	50	@ 440 V DC 100 kA L/R = 30 ms	3.9	6.7	CC 4.421 CP gLB 22x58/50	L076968	
	63		4.9	8.5	CC 4.421 CP gLB 22x58/63	M221133	
	80		6.2	10.8	CC 4.421 CP gLB 22x58/80	J098563	
	100		7.5	13.2	CC 4.421 CP gLB 22x58/100	K099507	
27x60	125	@ 440 V DC 100 kA L/R = 30 ms	12.6	22	CC 4.421 CP gLB 27x60/125	H098562	
	160		13.8	24.2	CC 4.421 CP gLB 27x60/160	M075704	

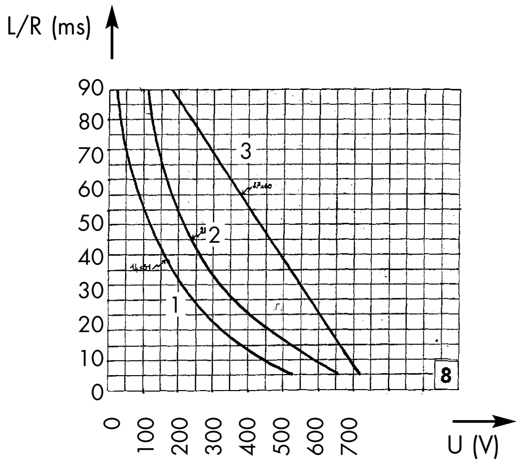
Minimum trip voltage: 20 V

See See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 440V DC

ELECTRICAL CHARACTERISTICS

DC applications data

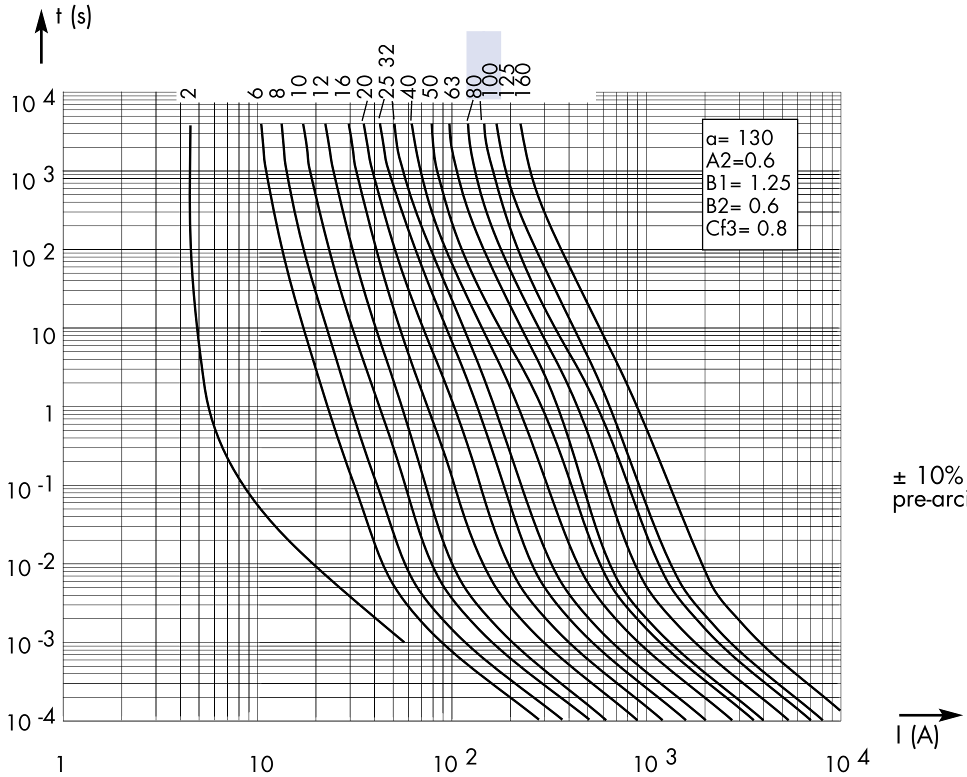


Left: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

1- Size 14x51
2- Size 22x58
3- Size 27x60

Max. AC voltage (50/60 Hz): 500 V with interrupting rating of 100 kA

Time vs. current characteristics



± 10% tolerance for mean pre-arcing current

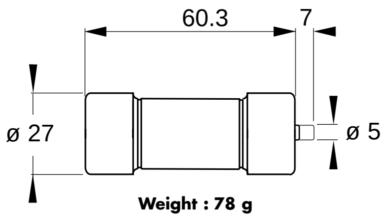
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Ferrule Fuses

660V DC

660 V DC
gRB from 0.8 to 110 A
Size 27x60

Dimensions





Trip force: 4.5N at 0 mm - 2.5N at 7 mm

MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref. Number	Pack.
27x 60	0.8	@ 660 V DC 50 kA L/R = 15 ms	0.25	0.4	CC 6.621 CP gRB 27x60/0.8	H098585	3 and 10 pieces
	1		0.25	0.4	CC 6.621 CP gRB 27x60/1	J098586	
	1.5		0.35	0.6	CC 6.621 CP gRB 27x60/1.5	K098587	
	2		0.4	0.7	CC 6.621 CP gRB 27x60/2	P098591	
	3.15		0.6	1	CC 6.621 CP gRB 27x60/3.15	Q098592	
	4		0.6	1	CC 6.621 CP gRB 27x60/4	R098593	
	5		0.7	1.1	CC 6.621 CP gRB 27x60/5	T098595	
	6.3		0.8	1.3	CC 6.621 CP gRB 27x60/6.3	Z098600	
	8		1.2	2	CC 6.621 CP gRB 27x60/8	L076301	
	10		1.3	2.3	CC 6.621 CP gRB 27x60/10	M076302	
	12		1.4	2.4	CC 6.621 CP gRB 27x60/12	L075703	
	16		1.9	3.3	CC 6.621 CP gRB 27x60/16	N076303	
	20		2.4	4.1	CC 6.621 CP gRB 27x60/20	C077006	
	25		2.8	4.7	CC 6.621 CP gRB 27x60/25	M075635	
	32		3.5	6	CC 6.621 CP gRB 27x60/32	P076304	
	40		4.7	8	CC 6.621 CP gRB 27x60/40	Q076305	
	50		4.8	8.3	CC 6.621 CP gRB 27x60/50	R076306	
	63		5.6	9.6	CC 6.621 CP gRB 27x60/63	P079961	
	80		6.4	11.2	CC 6.621 CP gRB 27x60/80	S079964	
	100		7.4	12.9	CC 6.621 CP gRB 27x60/100	T099400	
	110		7.7	13.7	CC 6.621 CP gRB 27x60/110	S076307	

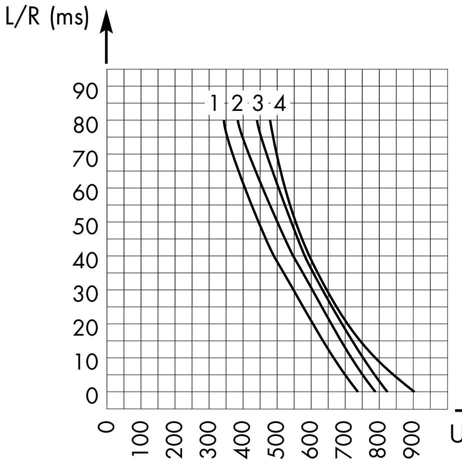
Minimum trip voltage : 20 V

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 660V DC

ELECTRICAL CHARACTERISTICS

DC application data

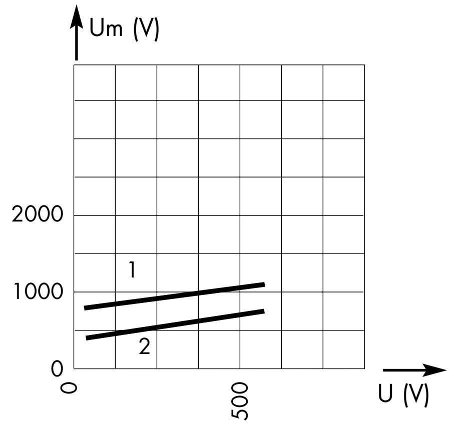


These curves indicate the maximum permissible value of time constant L/R as a function of the DC working voltage

1- 80 to 110 A
2- 25 to 63 A
3- 8 to 12 A
4- 0.8 to 6.3 A

Max. AC voltage (50/60 Hz):
660 V with 50 kA interrupting rating for I_N 6.3A
660 V with 200 kA interrupting rating for I_N > 6.3A

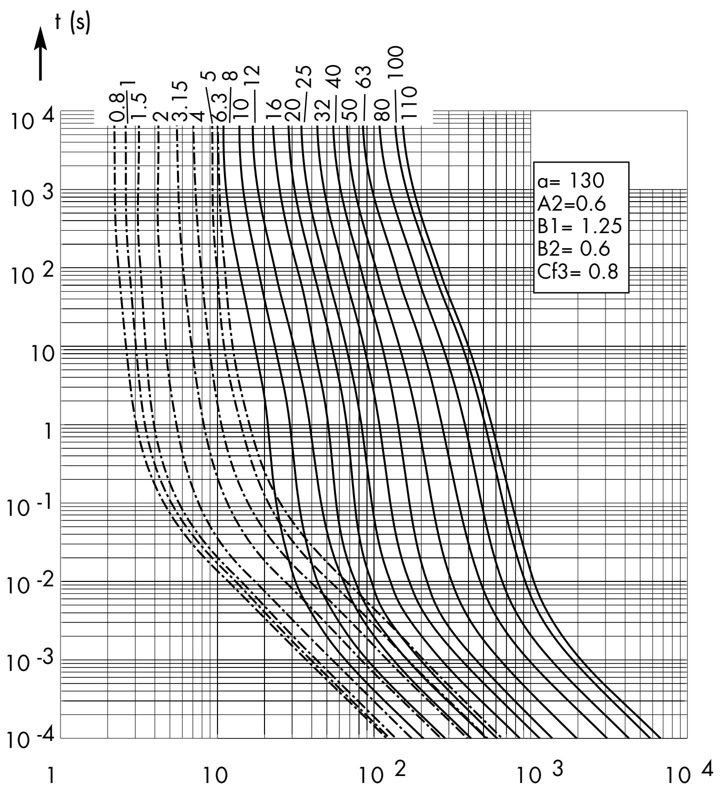
Peak arc voltage vs. working voltage



1- L/R = 60 ms
2- L/R = 30 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



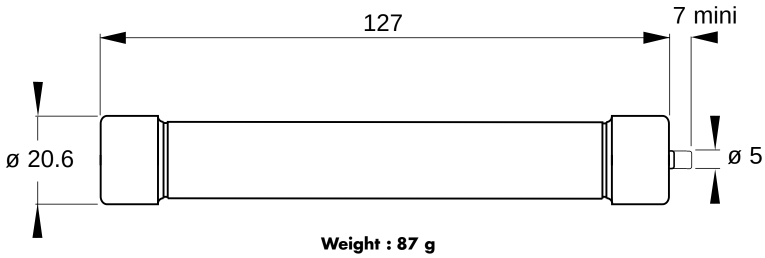
± 10% tolerance for mean pre-arcing current

Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Ferrule Fuses 1000V DC

1000 V DC
gRB-gRC from 6 to 63A
Size 20 x 127

Dimensions



Weight : 87 g



Trip force: 4.5N at 0 mm - 2.5N at 7 mm

MAIN CHARACTERISTICS

Size	Current rating I_N (A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number		Ref. Number	Pack.
20 x127	6	@ 1000 V DC 100 kA L/R = 20 ms	2.0	3.5	CC 1051 CP gRB 20x127/6	D 100 gRB 006 VI	Z088020	3 and 10 pieces
	8		2.2	3.8	CC 1051 CP gRB 20x127/8	D 100 gRB 008 VI	T088774	
	10		2.4	4.2	CC 1051 CP gRB 20x127/10	D 100 gRB 010 VI	A089493	
	12		3.0	5.3	CC 1051 CP gRB 20x127/12	D 100 gRB 012 VI	B089494	
	16		3.7	6.6	CC 1051 CP gRB 20x127/16	D 100 gRB 016 VI	C089495	
	20		4.4	7.7	CC 1051 CP gRB 20x127/20	D 100 gRB 020 VI	D089496	
	25		5.1	9	CC 1051 CP gRB 20x127/25	D 100 gRB 025 VI	E089497	
	32		6.0	10.5	CC 1051 CP gRB 20x127/32	D 100 gRB 032 VI	F089498	
	40		7.3	13.2	CC 1051 CP gRC 20x127/40	D 100 gRC 040 VI	S086795	
	50		8.5	15.5	CC 1051 CP gRC 20x127/50	D 100 gRC 050 VI	F086186	
	63*		9.6	17.4	CC 1051 CP gRC 20x127/63*	D 100 gRC 063 VI*	F083656*	

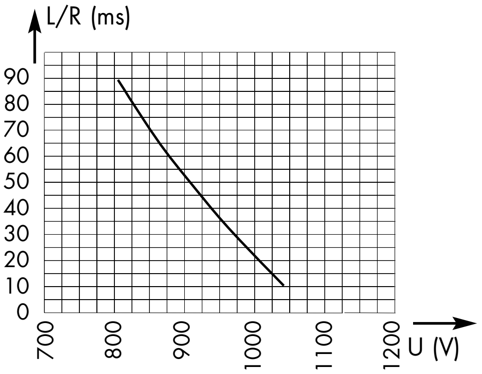
Minimum trip voltage: 50 V
* Use R.M.S. current less than 56 A when mounting in fuse-isolator

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 1000V DC

ELECTRICAL CHARACTERISTICS

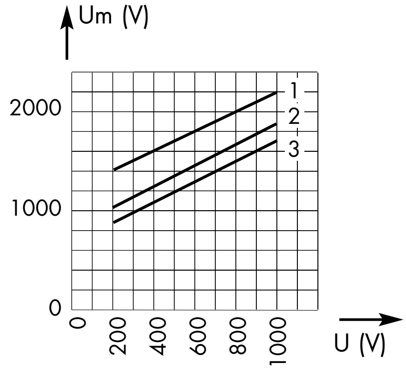
DC application data



Above: Curve indicates the maximum permissible value of time constant L/R as a function of the DC working voltage

Max. AC voltage (50/60 Hz): 1,500 V with interrupting rating of 100 kA

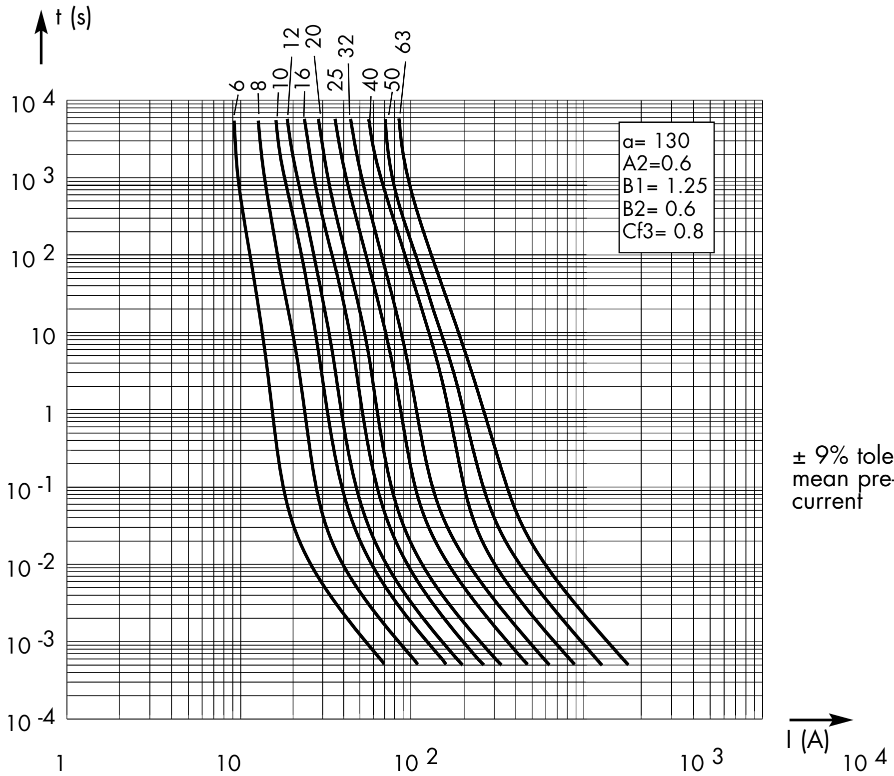
Peak arc voltage vs. working voltage



1- L/R = 50 ms
2- L/R = 25 ms
3- L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage, which may appear accross the fuse terminals, vs. DC working voltage

Time vs. current characteristics



± 9% tolerance for mean pre-arcing current

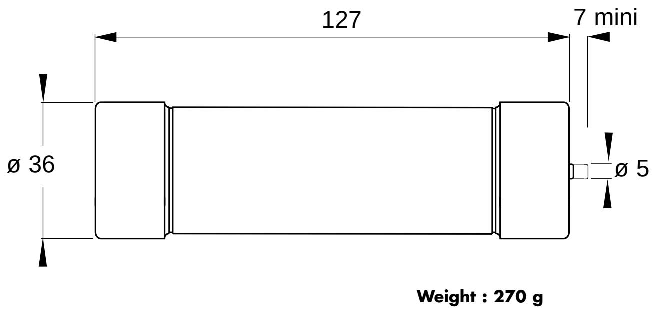
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

DC Fuses

Ferrule Fuses — 1000V DC

1000 V DC
gRB-gRC from 25 to 100 A
Size 36 x 127

Dimensions



Trip force: 4.5N at 0 mm - 2.5N at 7 mm



MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref. number	Pack.
36 x127	25	@ 1000 V DC 100 kA L/R = 20 ms	5.3	9.4	CC 1051 CP gRB 36x127/25	H 083980	9 pieces
	32		6.4	11.5	CC 1051 CP gRB 36x127/32	R 086495	
	40		6.5	11.6	CC 1051 CP gRB 36x127/40	G 089499	
	50		8.7	15.4	CC 1051 CP gRB 36x127/50	H 089500	
	63		10.5	18.8	CC 1051 CP gRC 36x127/63	J 089501	
	80		11.9	21.5	CC 1051 CP gRC 36x127/80	A 083651	
	100		13.2	24.1	CC 1051 CP gRC 36x127/100	Z 083650	

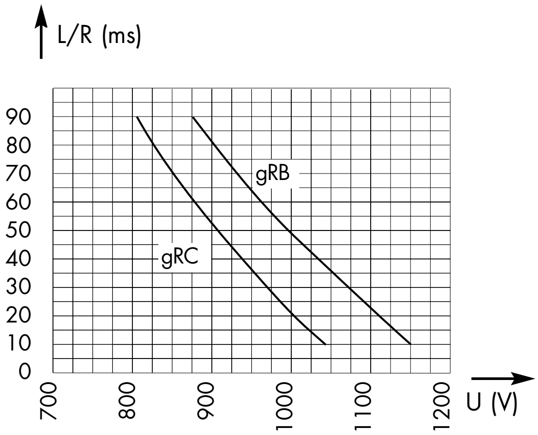
Minimum trip voltage: 50 V

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 1000V DC

ELECTRICAL CHARACTERISTICS

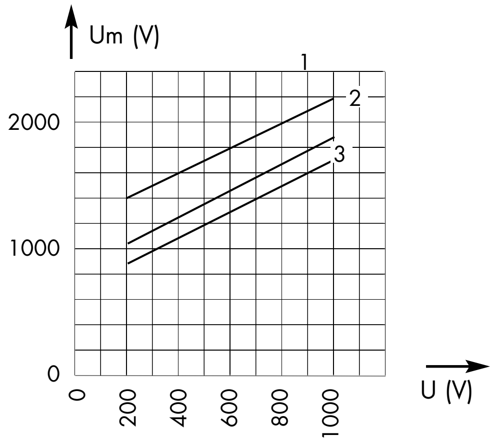
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,500 V with interrupting rating of 100 kA

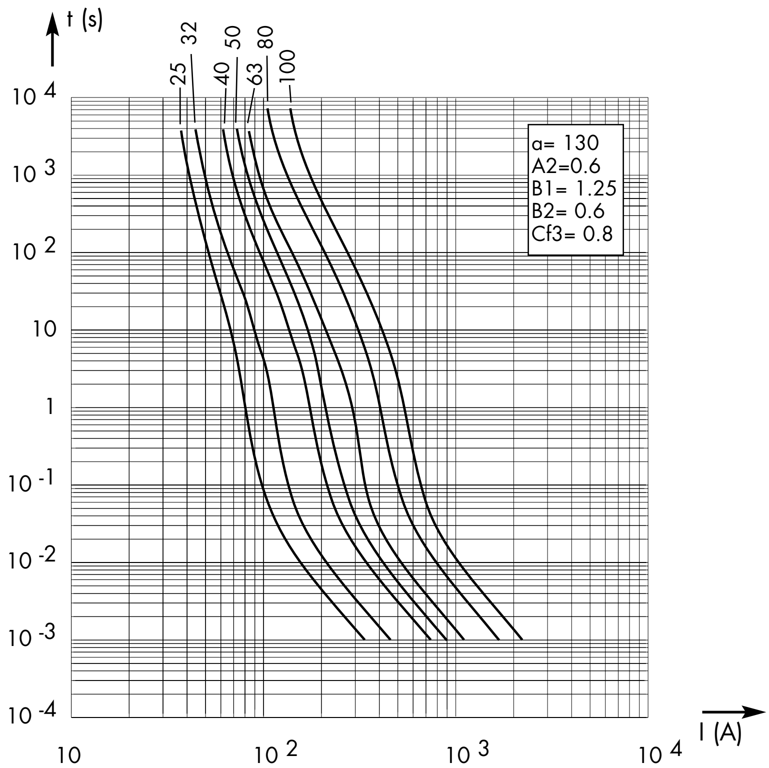
Peak arc voltage vs. working voltage



1- L/R = 50 ms
2- L/R = 25 ms
3- L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



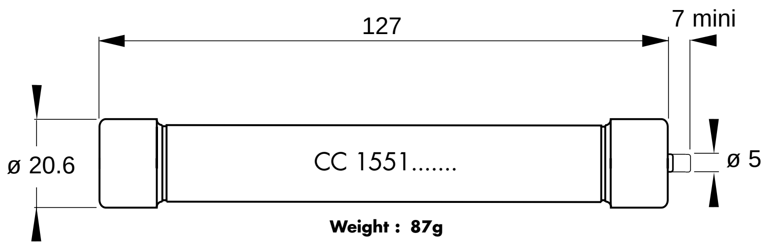
±7% tolerance for mean pre-arcing current

Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

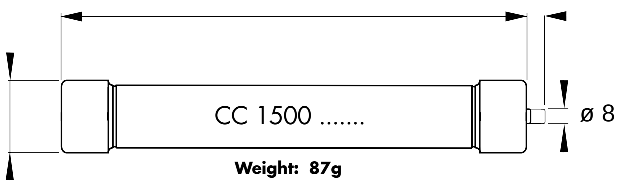
Ferrule Fuses — 1500V DC

1500 V DC
gRB - gRD from 0.8 to 25 A
Size 20 x 127

Dimensions



Trip force: 4.5N at 0 mm - 2.5N at 7 mm





MAIN CHARACTERISTICS

Size	Current rating I_N (A)	Interrupting rating	Watts losss 0.8 I_N	Watts losss I_N	Catalog Number		Ref. Number	Pack.
20 x 127	0.8	@ 1000 V DC 100 kA L/R = 100 ms	0.5	0.9	CC 1551 CP gRB 20x127/0.8	D 150 gRB 0.8 VI[1]	E075743	3 and 10 pieces
	1		0.5	0.9	CC 1551 CP gRB 20x127/1	D 150 gRB 001 VI[1]	E075744	
	1.5		0.8	1.4	CC 1551 CP gRB 20x127/1.5	D 150 gRB 01.5 VI[1]	G075745	
	2		0.9	1.6	CC 1551 CP gRB 20x127/2	D 150 gRB 002 VI[1]	B088367	
	3.15		1.2	2.1	CC 1551 CP gRB 20x127/3.15	D 150 gRB 3.15VI[1]	H075746	
	4		1.3	2.1	CC 1551 CP gRB 20x127/4	D 150 gRB 004 VI[1]	J075747	
	5		1.4	2.3	CC 1551 CP gRB 20x127/5	D 150 gRB 005 VI[1]	C088368	
	0.8	@ 1000 V DC 30 kA L/R = 30 ms	0.5	0.9	CC 1500 CP gRB 20x127/0.8	D 150 gRB 0.8 V	J081842	
	1		0.5	0.9	CC 1500 CP gRB 20x127/1	D 150 gRB 001 V	R079894	
	1.5		0.8	1.4	CC 1500CP gRB 20x127/1.5	D 150 gRB 01.5 V	K081843	
	2		0.9	1.6	CC 1500 CP gRB 20x127/2	D 150 gRB 002 V	Y099243	
	3.15		1.2	2.1	CC 1500 CP gRB 20x127/3.15	D 150 gRB 3.15 V	L081844	
	4		1.3	2.1	CC 1500CP gRB 20x127/4	D 150 gRB 004 V	Z099244	
	5		1.4	2.3	CC 1500 CP gRB 20x127/5	D 150 gRB 005 V	A099245	
	6	@ 1500 V DC 30 kA L/R = 55 ms	3.4	6.3	CC 1500 CP gRD 20x127/6	D 150 gRD 006 V	E082804	
	8		3.3	6.0	CC 1500 CP gRD 20x127/8	D 150 gRD 008 V	Z080867	
	10		3.5	6.1	CC 1500 CP gRD 20x127/10	D 150 gRD 010 V	F081655	
	12		3.9	6.8	CC 1500 CP gRD 20x127/12	D 150 gRD 012 V	B080593	
	16		5	8.9	CC 1500 CP gRD 20x127/16	D 150 gRD 016 V	Q081457	
	20		5.3	9.6	CC 1500 CP gRD 20x127/20	D 150 gRD 020 V	D082803	
	25		6.6	12	CC 1500 CP gRD 20x127/25	D 150 gRD 025 V	A080431	

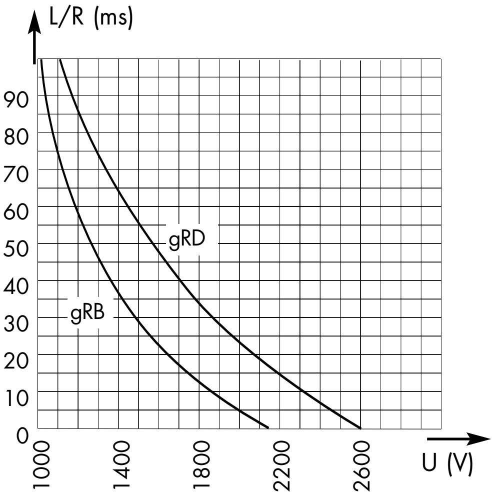
Minimum trip voltage: 50 V
[1] Fuses CC 1551 CP gRB 20x... D150 gRB... UL Recognized

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 1500V DC

ELECTRICAL CHARACTERISTICS

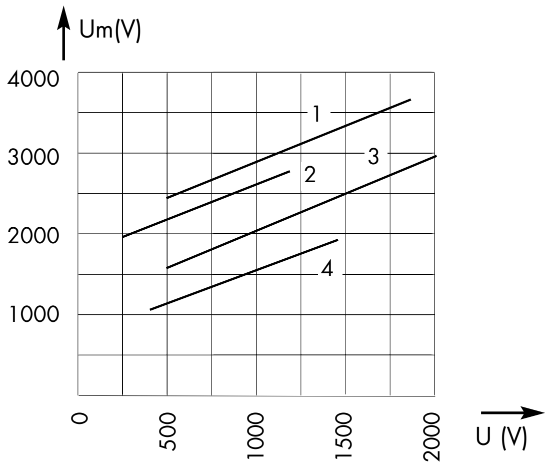
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
2,500 V with interrupting rating of 50 kA

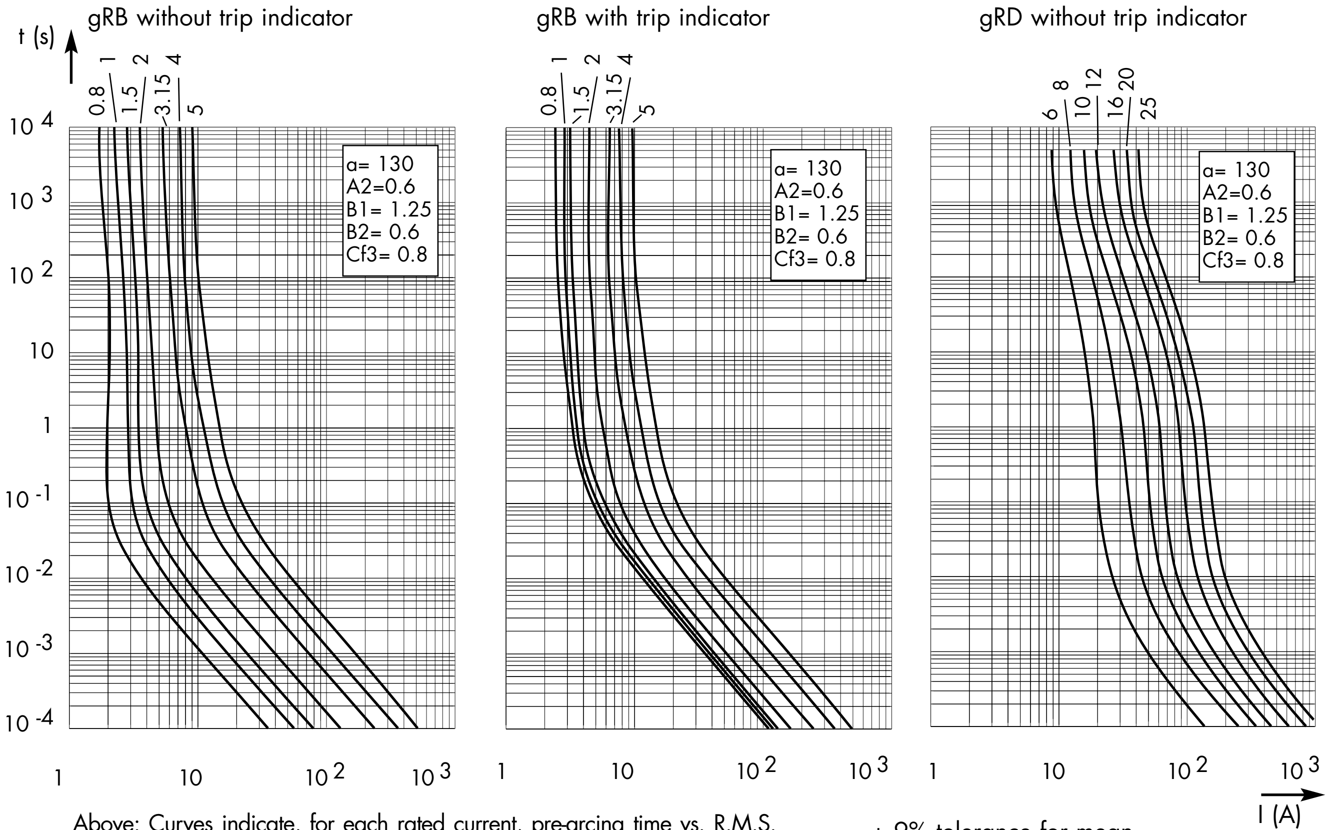
Peak arc voltage vs. working voltage



Curve 1: gRD @ L/R = 30 ms
Curve 2: gRB @ L/R = 60 ms
Curve 3: gRD @ L/R = 15 ms
Curve 4: gRB @ L/R = 30 ms

Above: Curves indicate for various time constants L/R peak arc voltage which may appear across the fuse terminals, vs. DC working voltage

Time vs. current characteristics



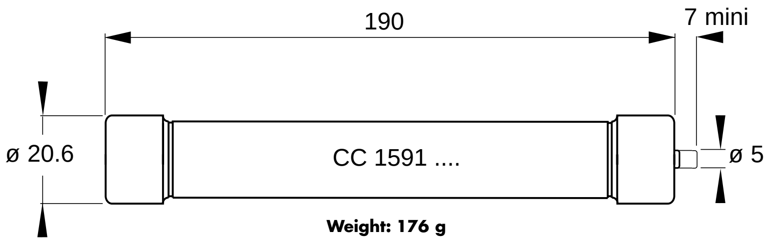
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

± 9% tolerance for mean pre-arcing current

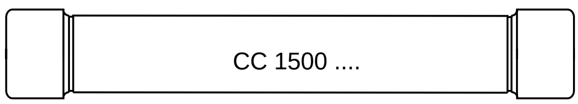
Ferrule Fuses 1500V DC

1500 V DC
gRC from 6 to 32 A
Size 20 x190

Dimensions



Weight: 176 g



Weight: 176 g

Trip force: 4.5N at 0 mm - 2.5N at 7 mm



MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref Number	Pack.
20 x190	6	@ 1500 V DC 60 kA L/R = 40 ms	4.8	7.8	CC 1591 CP gRC 20x190/6	D 083102	10 pieces
	8		5.3	8.8	CC 1591 CP gRC 20x190/8	V 083738	
	10		6.5	10.5	CC 1591 CP gRC 20x190/10	G 087245	
	12		7.0	11.5	CC 1591 CP gRC 20x190/12	Y 080429	
	16		8.0	13	CC 1591 CP gRC 20x190/16	N 088378	
	20		9.5	15	CC 1591 CP gRC 20x190/20	Q 087345	
	25		12	19.5	CC 1591 CP gRC 20x190/25	Z 080430	
	32		16	26	CC 1591 CP gRC 20x190/32	G 085911	
	6		4.8	7.8	CC 1500 CP gRC 20x190/6	Z 089469	
	8		5.3	8.8	CC 1500 CP gRC 20x190/8	A 089470	
	10		6.5	10.5	CC 1500 CP gRC 20x190/10	B 089471	
	12		7.0	11.5	CC 1500 CP gRC 20x190/12	C 089472	
	16		8.0	13	CC 1500 CP gRC 20x190/16	D 089473	
	20		9.5	15	CC 1500 CP gRC 20x190/20	E 089474	
	25		12	19.5	CC 1500 CP gRC 20x190/25	F 089475	
	32		16	26	CC 1500 CP gRC 20x190/32	G 089476	

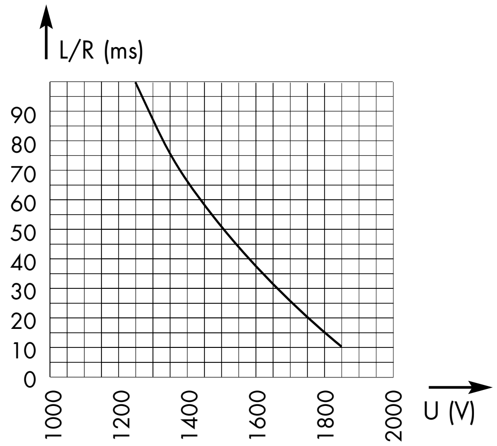
Minimum trip voltage: 90 V

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 1500V DC

ELECTRICAL CHARACTERISTICS

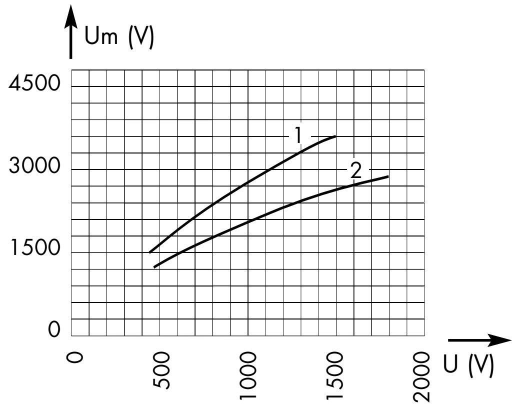
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3,000 V with interrupting rating of 50 kA

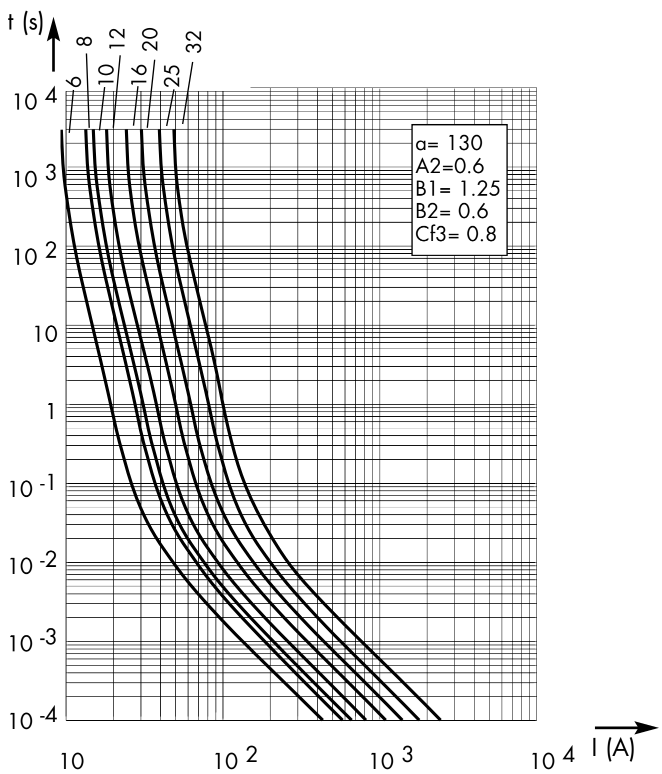
Peak arc voltage vs. working voltage



1- L/R = 45 ms
2- L/R = 15 ms

Above: Curves indicate for various time constants L/R peak arc voltage which may appear across fuse terminals, vs. DC working voltag

Time vs. current characteristics



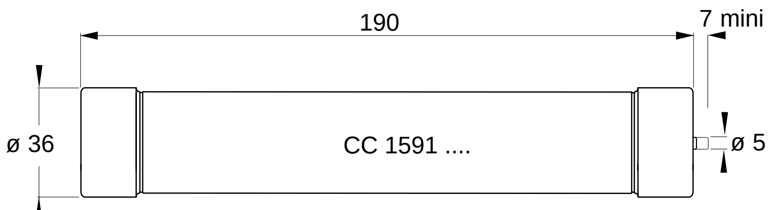
± 7% tolerance for mean pre-arcing current

Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

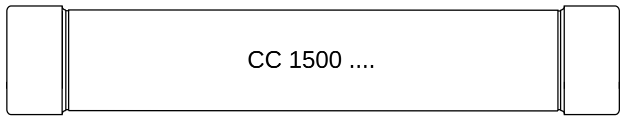
Ferrule Fuses — 1500V DC

1500 V DC
gRC - gRD from 40 to 100 A
Size 36 x 190

Dimensions



Weight: 508 g



Weight: 508 g



Trip force: 4.5N at 0 mm - 2.5N at 7 mm

MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref. Number	Pack.
36 x190	40	@ 1500 V DC 60 kA L/R = 60 ms	14	26	CC 1591 CP gRC 36x190/40	M 080419	10 pieces
	50		16.5	30	CC 1591 CP gRC 36x190/50	N 080420	
	63		20.6	38	CC 1591 CP gRC 36x190/63	P 080421	
	80		18	33	CC 1591 CP gRD 36x190/80	N 221134	
	100		23	42	CC 1591 CP gRD 36x190/100	Y 220154	
	40	@ 1500 V DC 100 kA L/R = 30 ms	14	26	CC 1500 CP gRC 36x190/40	H 089477	
	50		16.5	30	CC 1500 CP gRC 36x190/50	J 089478	
	63		20.6	38	CC 1500 CP gRC 36x190/63	K 089479	
	80		18	33	CC 1500 CP gRD 36x190/80	Q 078007	
	100		23	42	CC 1500 CP gRD 36x190/100	K 078025	

Minimum trip voltage : 90 V

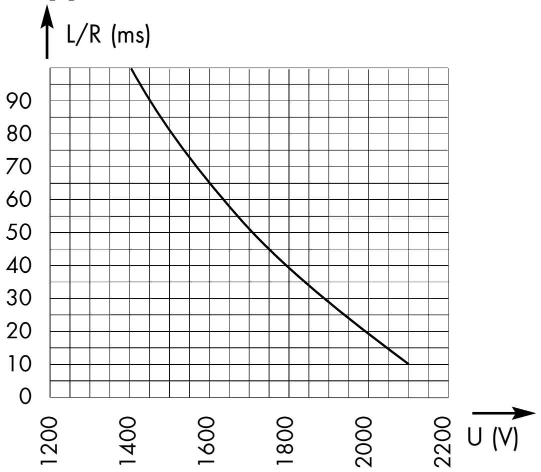
See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

DC Fuses

Ferrule Fuses 1500V DC

ELECTRICAL CHARACTERISTICS

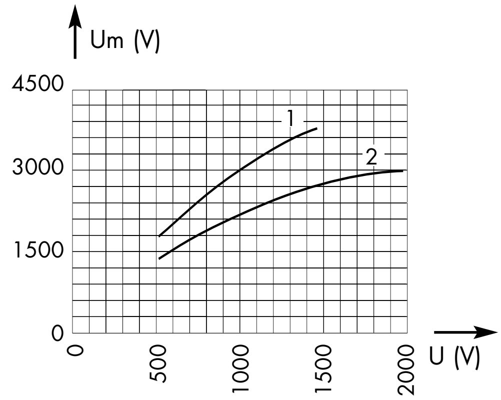
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3,000 V with interrupting rating of 50 kA

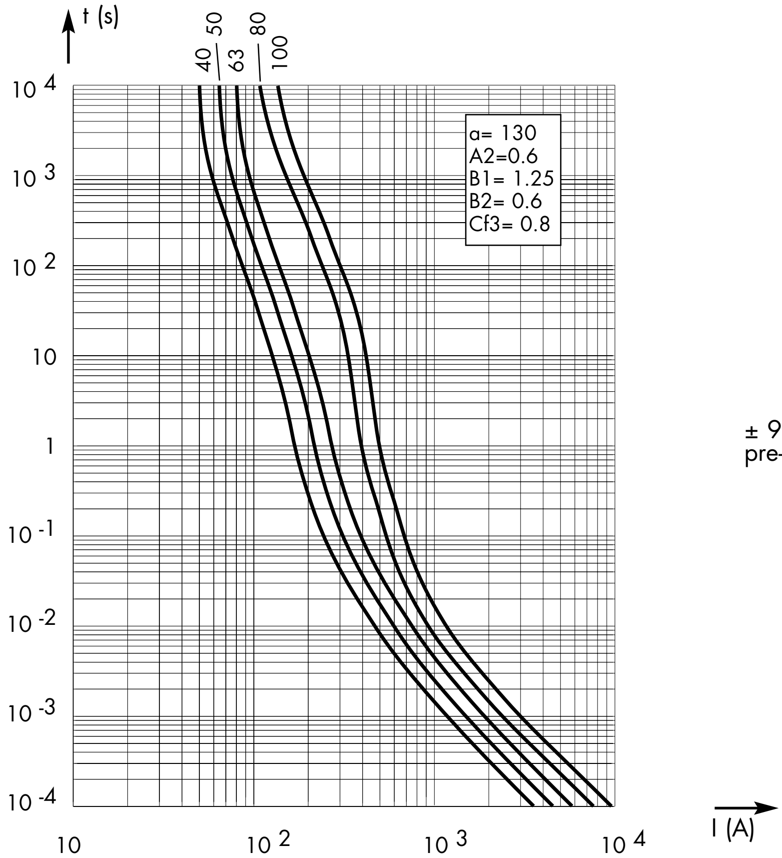
Peak arc voltage vs. working voltage



1- L/R = 45 ms
2- L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



± 9% tolerance for mean pre-arcing current

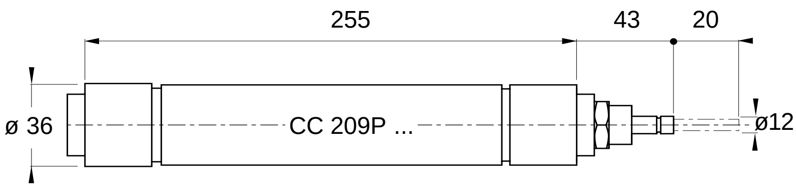
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

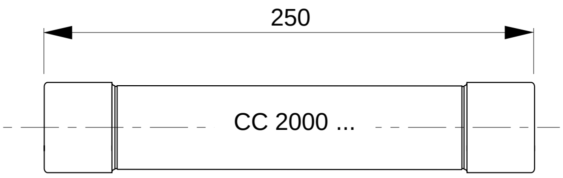
Ferrule Fuses

2000V DC

2000 V DC
gRB from 0.8 to 40 A
Size 36 x 250

Dimensions





Trip force: 15 N at 20 mm



MAIN CHARACTERISTICS

Size	Current rating I_N (A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref number	Pack.
36x250	0.8	@ 2000 V DC 30 kA L/R = 20 ms	1	1.8	CC 2000 CP gRB 36x250/0.8	P 221135	3 pieces
	1		1.1	2	CC 2000 CP gRB 36x250/1	R 093096	
	1.5		1.8	3	CC 2000 CP gRB 36x250/1.5	S 093097	
	2		2	3.3	CC 2000 CP gRB 36x250/2	T 093098	
	3.15		2.8	5	CC 2000 CP gRB 36x250/3.15	V 093099	
	4		4	7	CC 2000 CP gRB 36x250/4	N 084951	
	5		5	8.8	CC 2000 CP gRB 36x250/5	Q 221136	
	6		5.3	9	CC 2000 CP gRB 36x250/6	S 084955	
	8		6	10	CC 2000 CP gRB 36x250/8	V 090339	
	10		7	12	CC 2000 CP gRB 36x250/10	H 093157	
	12		7.6	13	CC 2000 CP gRB 36x250/12	W 093100	
	16		10.5	18	CC 2000 CP gRB 36x250/16	X 093101	
	20		10	17.5	CC 2000 CP gRB 36x250/20	H 086257	
	25		12	21	CC 2000 CP gRB 36x250/25	Y 081441	
	32		15.2	26	CC 2000 CP gRB 36x250/32	X 081440	
	40		19.6	33.6	CC 2000 CP gRB 36x250/40	W 081439	
	6		9.1	15.7	CC 209P CP gRB 36x250/6.3	N 098498	
	10		7.0	12	CC 209P CP gRB 36x250/10	L 084949	
	12		7.6	13	CC 209P CP gRB 36x250/12	M 098497	
	20		10	17.5	CC 209P CP gRB 36x250/20	M 084950	
	25		12	21	CC 209P CP gRB 36x250/25	R 087461	
	32		15.2	26	CC 209P CP gRB 36x250/32	L 081131	
	40		19.6	33.6	CC 209P CP gRB 36x250/40	W 087373	

Minimum trip voltage: 90 V

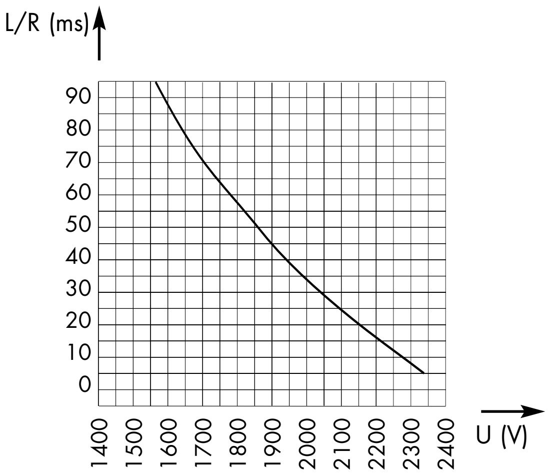
These fuses can be fitted with a MC 1-5 Flex. microswitch (see Medium Voltage section)

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 2000V DC

ELECTRICAL CHARACTERISTICS

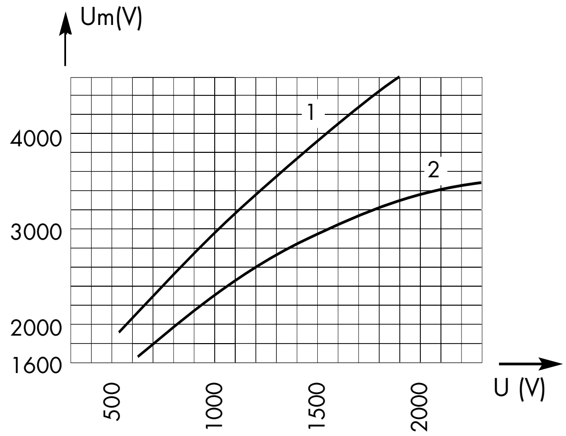
DC application data



Above: Curve indicates the maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3,000 V with interrupting rating of 50 kA

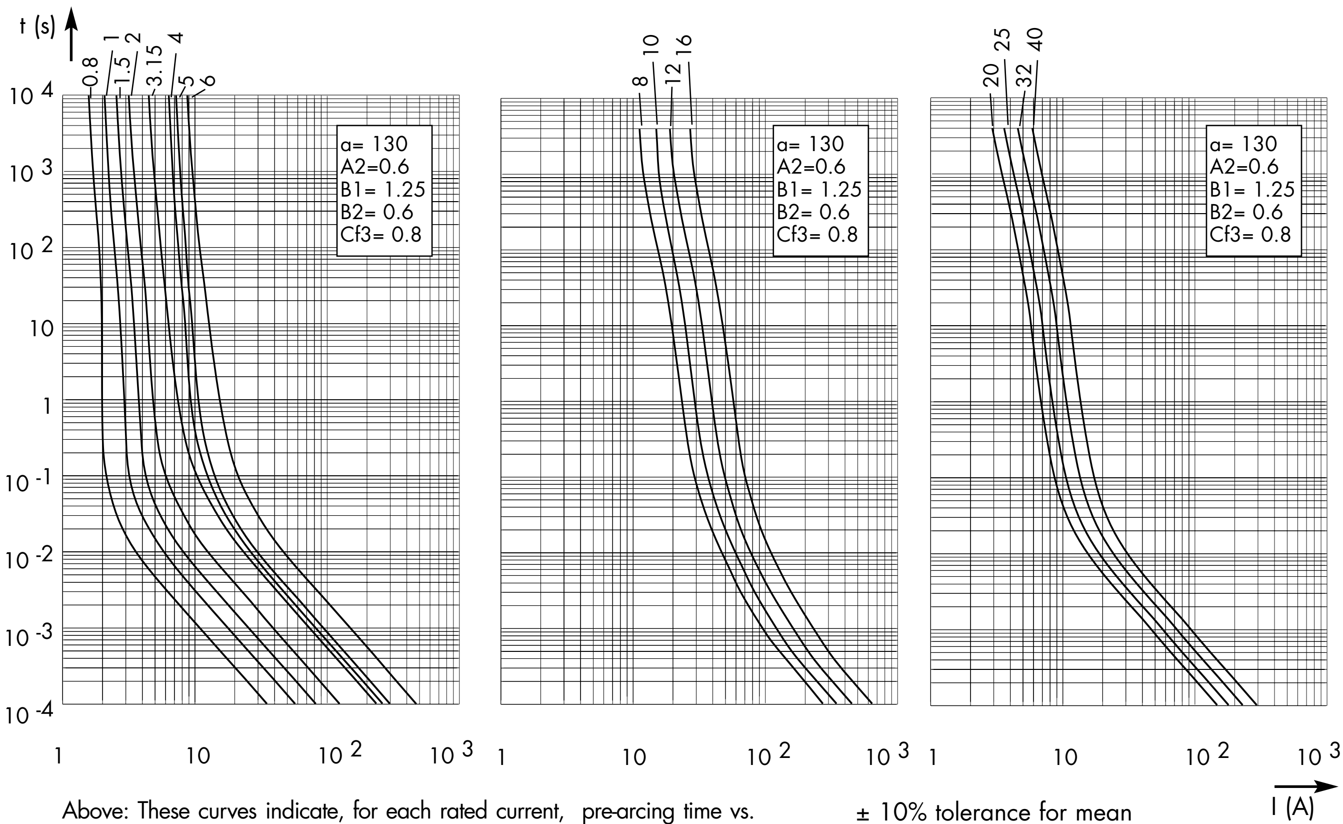
Peak arc voltage vs. working voltage



1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above: These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

± 10% tolerance for mean pre-arcing current

Semiconductor Fuses

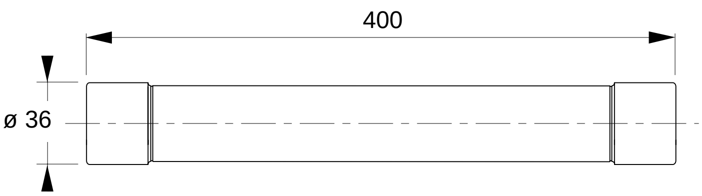
DC Fuses

Ferrule Fuses

4000V DC

4000 V DC
gRC from 0.8 to 20 A
Size 36 x 400

Dimensions



Weight: 785 g



MAIN CHARACTERISTICS

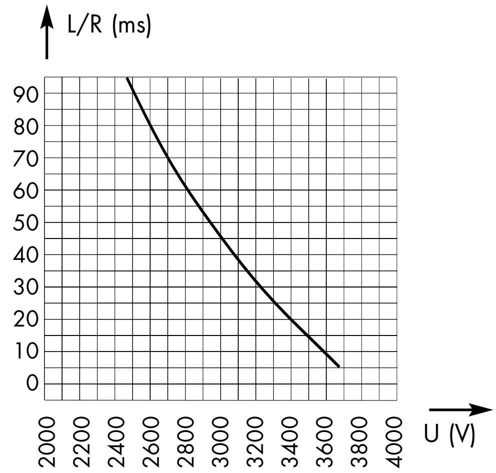
Size	Current rating I_N (A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number	Ref Number	Pack.
36x400	0.8	@ 4000 V DC 30 kA L/R = 20 ms	1.5	2.5	CC 4000 CP gRC 36x400/0.8	Z 220293	3 pieces
	1		1.6	2.7	CC 4000 CP gRC 36x400/1	R 221137	
	1.5		2.4	4.1	CC 4000 CP gRC 36x400/1.5	S 221138	
	2		3.0	5.0	CC 4000 CP gRC 36x400/2	Z 089423	
	3.15		3.9	6.4	CC 4000 CP gRC 36x400/3.15	T 221139	
	4		6.0	10	CC 4000 CP gRC 36x400/4	A 089424	
	5		9.6	16	CC 4000 CP gRC 36x400/5	Y 098461	
	6		11	19	CC 4000 CP gRC 36x400/6	E 099847	
	8		12	22	CC 4000 CP gRC 36x400/8	V 221140	
	10		13	23	CC 4000 CP gRC 36x400/10	G 098469	
	12		15	26	CC 4000 CP gRC 36x400/12	C 098396	
	16		15	27	CC 4000 CP gRC 36x400/16	Z 083052	
	20		18.6	33	CC 4000 CP gRC 36x400/20	F 099848	

See Fuse Blocks and Fuse Holders, and Medium Voltage fuse clips

Ferrule Fuses 4000V DC

ELECTRICAL CHARACTERISTICS

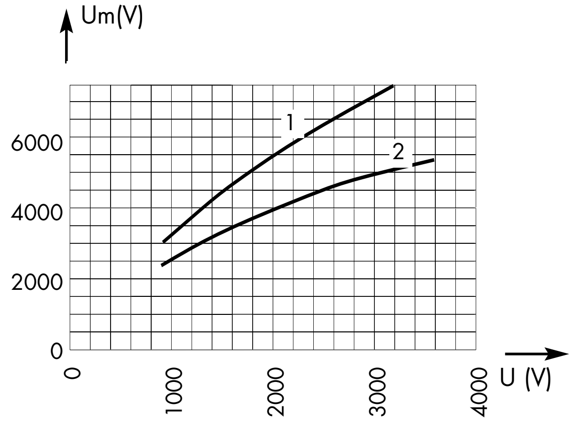
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz): 4,000 V with interrupting rating of 570 kA

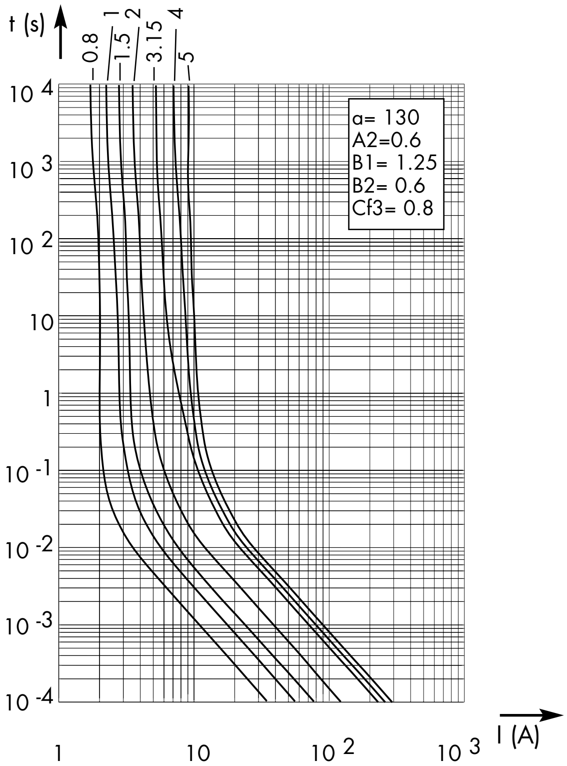
Peak arc voltage vs. working voltage

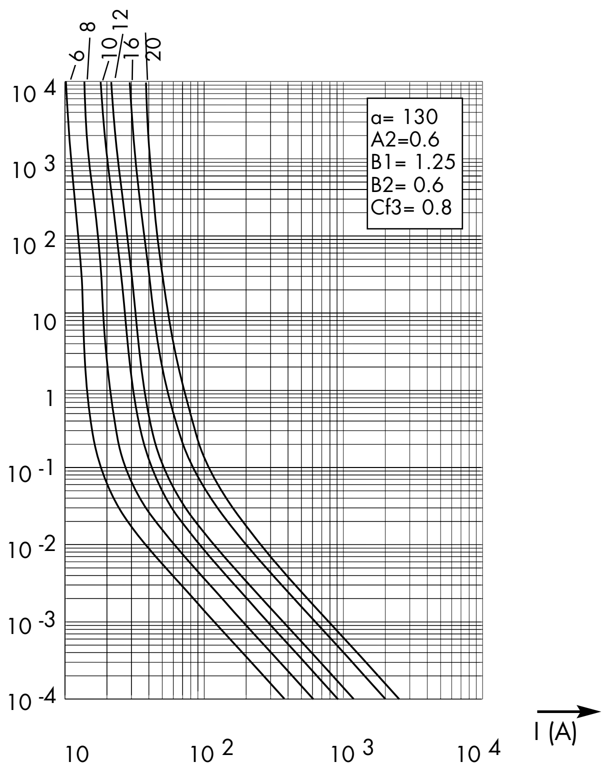


1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage, which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics





Above, left and right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

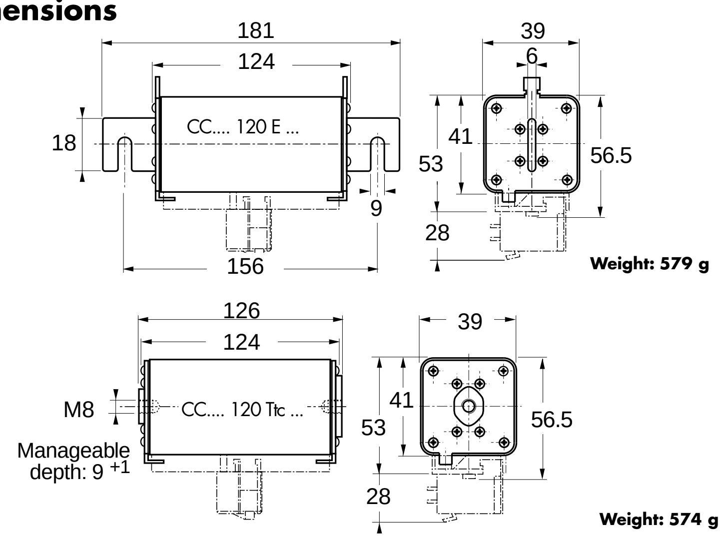
± 10% tolerance for mean pre-arcing current

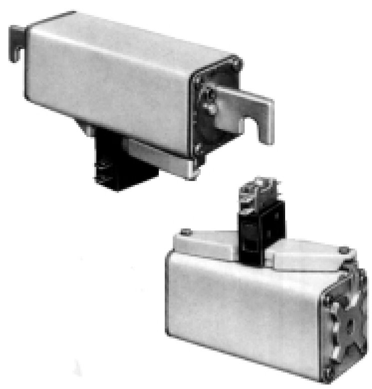
DC Fuses

Square-body Fuses 750V DC

750 V DC
gRC from 50 to 160 A
Size 120

Dimensions





MAIN CHARACTERISTICS

Size	Current rating I_N (A)	Interrupting rating	Maximum I2t @ 900 V = L/R 40 ms		Watts loss		Catalog Number (1)	Ref. Number	Pack.
			Ip = 10 I_N	Ip = 50 I_N	0.8 I_N	I_N			
120	50	@ 750 V= 100k A L/R = 100 ms	42500	8500	4.4	8.1	CC 7,5 gRC 120 EF 0050	Y084776	1 piece
	63		75500	15000	5.7	10.4	CC 7,5 gRC 120 EF 0063	R085207	
	80		125000	24500	7.3	13.4	CC 7,5 gRC 120 EF 0080	Q085206	
	100		200000	40000	9.1	16.7	CC 7,5 gRC 120 EF 0100	P085205	
	125		315000	62500	11.5	21	CC 7,5 gRC 120 EF 0125	R086242	
	160		485000	100000	15	27	CC 7,5 gRC 120 EF 0160	N085204	
	50	@ 900 V= 100k A L/R = 40 ms	42500	8500	4.4	8.1	CC 7,5 gRC 120 TTF 0050	B220824	
	63		75500	15000	5.7	10.4	CC 7,5 gRC 120 TTF 0063	Q082400	
	80		125000	24500	7.3	13.4	CC 7,5 gRC 120 TTF 0080	Z090435	
	100		200000	40000	9.1	16.7	CC 7,5 gRC 120 TTF 0100	R082401	
	125		315000	62500	11.5	21	CC 7,5 gRC 120 TTF 0125	P085251	
	160		485000	100000	15	27	CC 7,5 gRC 120 TTF 0160	R085253	

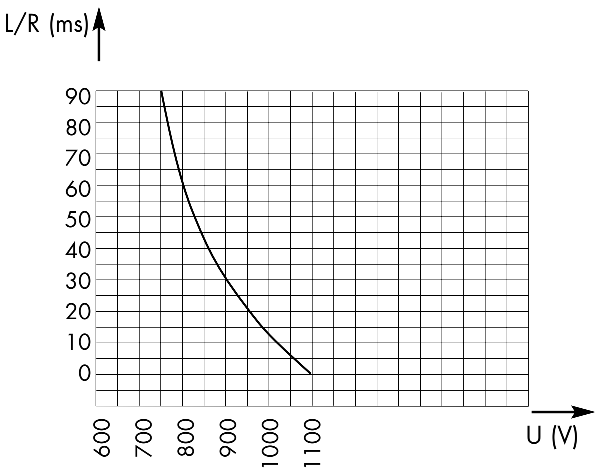
Microswitch: MC 3E 15N Ref. Number: D310020 (see page 423)
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 750V DC

ELECTRICAL CHARACTERISTICS

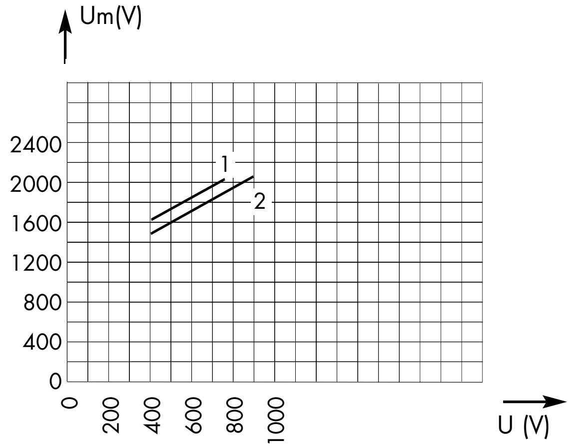
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,250 V with interrupting rating of 170 kA

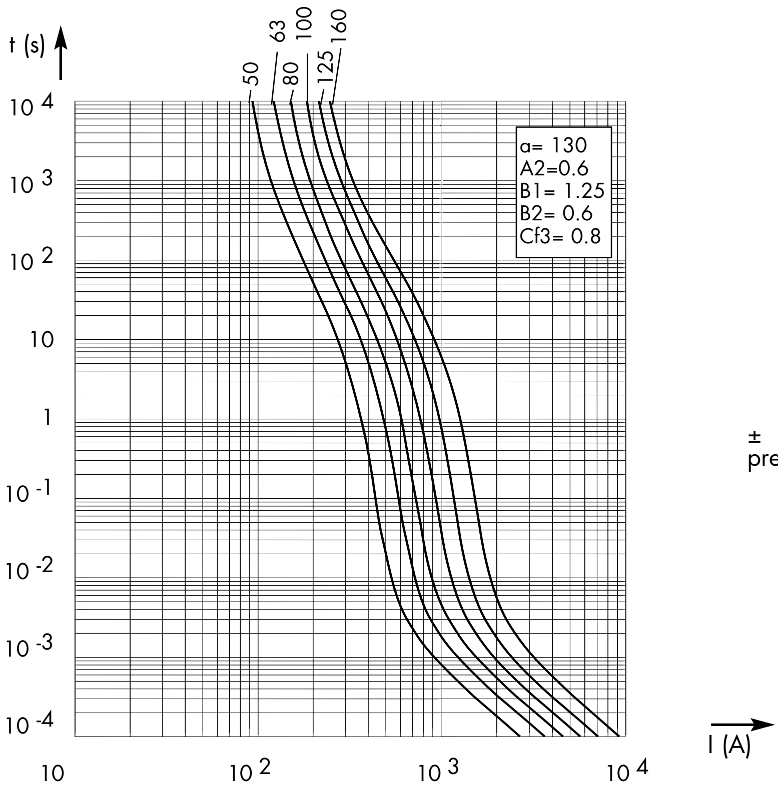
Peak arc voltage vs. working voltage



1 : L/R = 100 ms
2 : L/R = 40 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

± 7% tolerance for mean pre-arcing current

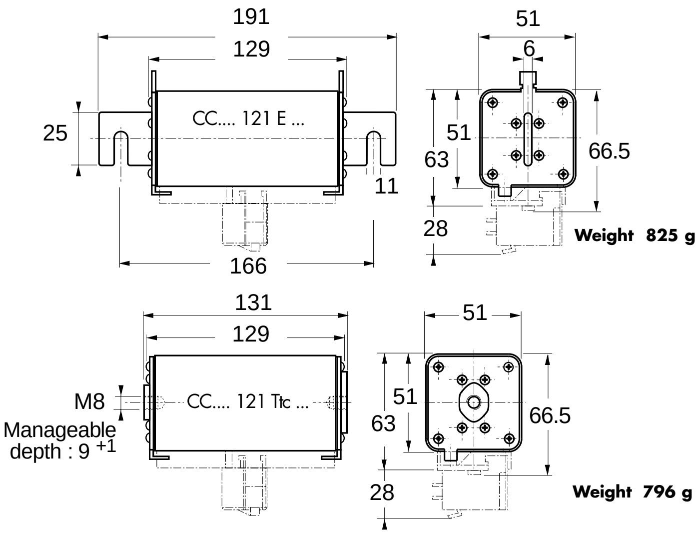
Semiconductor Fuses

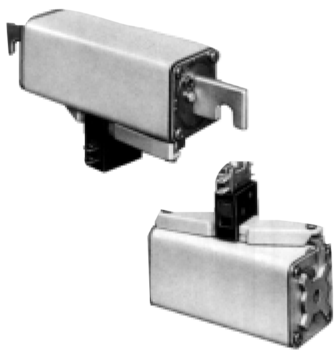
DC Fuses

Square-body Fuses 750V DC

750 V DC
gRC from 200 to 250 A
Size 121

Dimensions





MAIN CHARACTERISTICS

Size	Current rating I_N (A)	Interrupting rating	Maximum I2t @ 900 V = L/R 40 ms		Watts loss		Catalog Number (1)	Ref. Number	Pack.
			I_p = 10 I_N	I_p = 50 I_N	0.8 I_N	I_N			
121	200 250	@750 V DC 100 kA L/R = 100 ms	755000 1250000	150000 250000	20.5 25.5	37.5 46.7	CC 7,5 gRC 121 EF 0200 CC 7,5 gRC 121 EF 0250	A086710 M085203	1 piece
	200 250	@ 900 V DC 100 kA L/R = 40 ms	755000 1250000	150000 250000	20.5 25.5	37.5 46.7	CC 7,5 gRC 121 TTF 0200 CC 7,5 gRC 121 TTF 0250	N085250 Q085252	

Microswitch: MC 3E 1-5N Ref. Number: D310020C (see page 423)

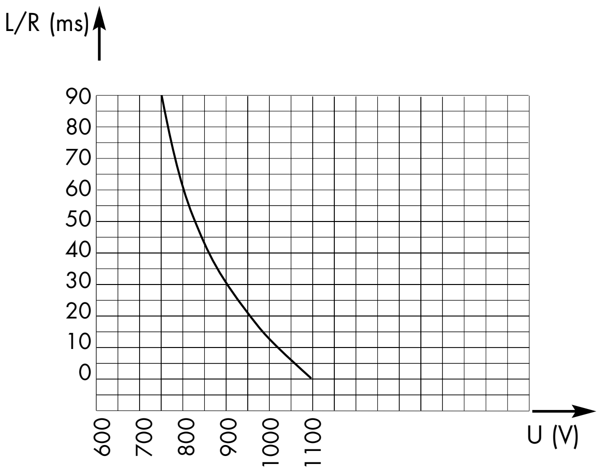
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 750V DC

ELECTRICAL CHARACTERISTICS

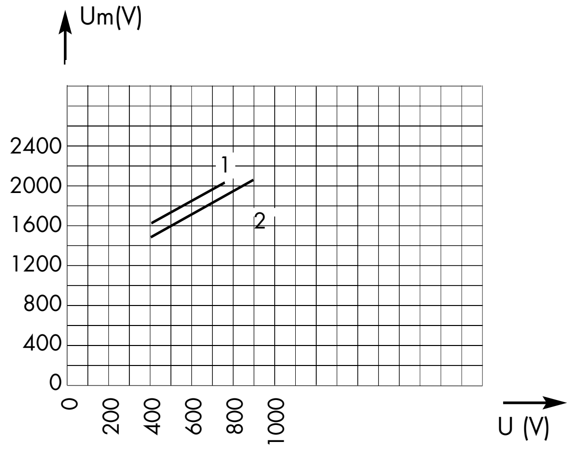
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,250 V with interrupting rating of 170 kA

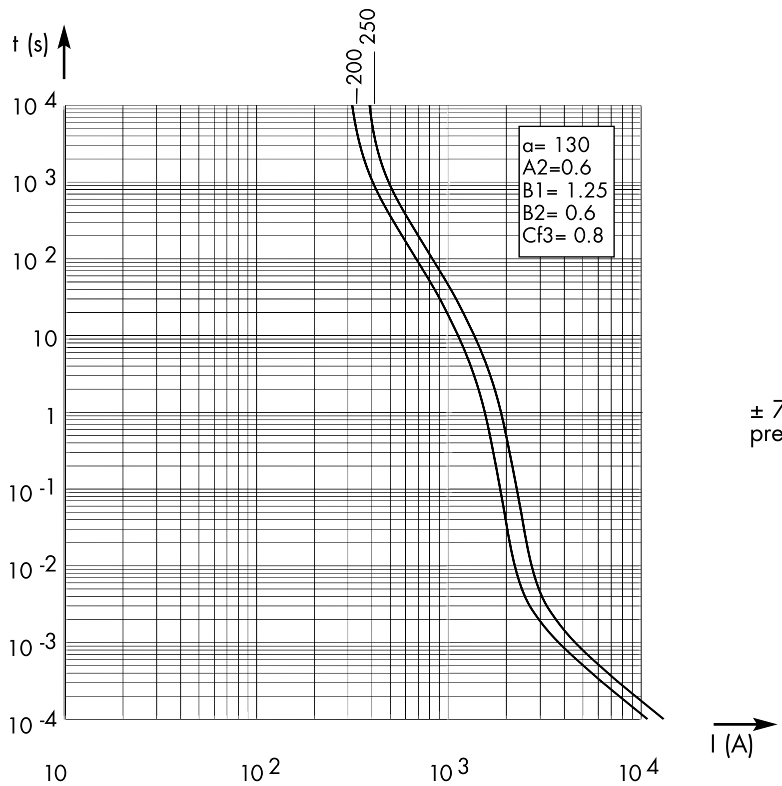
Peak arc voltage vs. working voltage



1 : L/R = 100 ms
2 : L/R = 40 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals vs. DC working voltage

Time vs. current characteristics



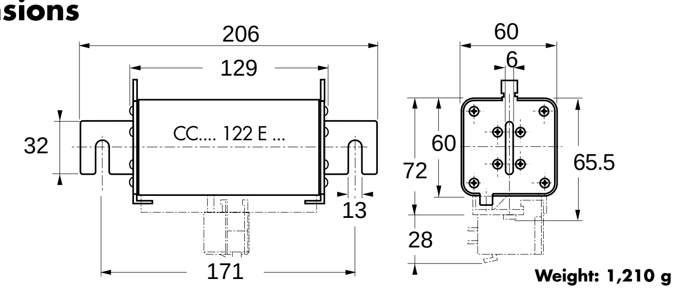
± 7% tolerance for mean pre-arcing current

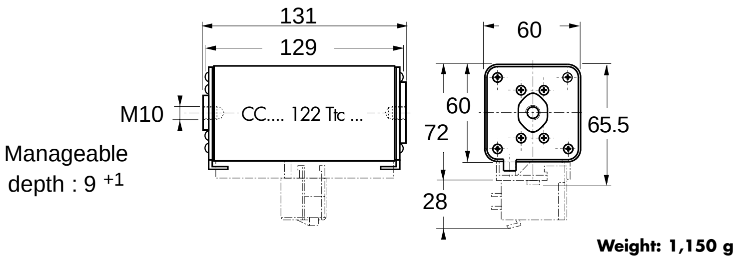
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

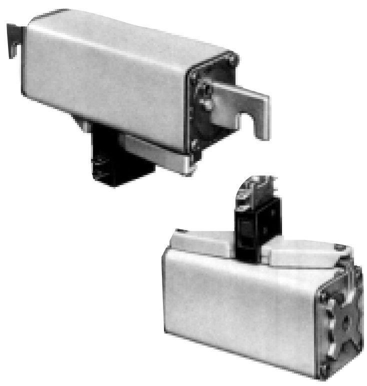
Square-body Fuses 750V DC

750 V DC
gRC-gRD from 250 to 500 A
Size 122

Dimensions







MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 900 V = L/R 40 ms		Watts loss at		Catalog Number (1)	Ref. Number	Pack.
			$I_p = 10\ I_N$	$I_p = 50\ I_N$	$0.8\ I_N$	I_N			
122	250	@ 750 V DC 100k A L/R = 100 ms	$1.25\ 10^6$	250,000	25.5	46.7	CC 7,5 gRC 122 EF 0250	A087331	1 piece
	315		$2\ 10^6$	400,000	31.5	58	CC 7,5 gRC 122 EF 0315	B087332	
	350		$2.5\ 10^6$	500,000	35	64.5	CC 7,5 gRC 122 EF 0350	W221141	
	400		$3.1\ 10^6$	600,000	40.5	74.5	CC 7,5 gRC 122 EF 0400	L089388	
	450		$4\ 10^6$	800,000	49	90	CC 7,5 gRD 122 EF 0450	P220951	
	500		$6.2\ 10^6$*	$1.2\ 10^6$*	52	95	CC 7,5 gRD 122 EF 0500	Q220952	
	250	@ 900 V DC 100k A L/R = 40 ms	$1.25\ 10^6$	250,000	25.5	46.7	CC 7,5 gRC 122 TTF 0250	B090437	1 piece
	315		$2\ 10^6$	400,000	31.5	58	CC 7,5 gRC 122 TTF 0315	M085249	
	350		$2.5\ 10^6$	500,000	35	64.5	CC 7,5 gRC 122 TTF 0350	G220898	
	400		$3.1\ 10^6$	600,000	40.5	74.5	CC 7,5 gRC 122 TTF 0400	C090438	
	450		$4\ 10^6$	800,000	49	90	CC 7,5 gRD 122 TTF 0450	R220953	
	500		$6.2\ 10^6$*	$1.2\ 10^6$*	52	95	CC 7,5 gRD 122 TTF 0500	S220954	

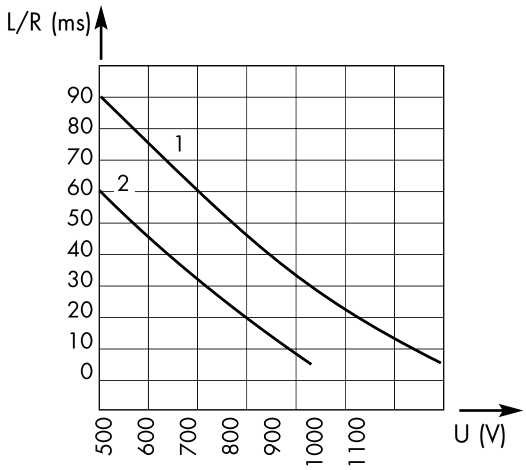
* Max. I2t @ 800 V=, L/R=40 ms

Microswitch: MC 3E 1-5N Ref. Number: D310020 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 750V DC

ELECTRICAL CHARACTERISTICS

DC application data

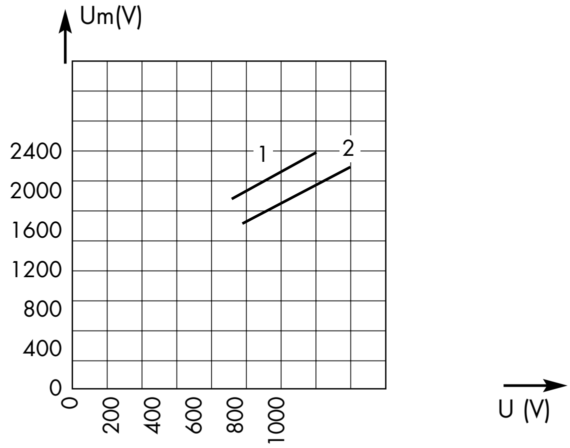


1: curve gRC - gRD 450A
2: curve gRD 500A

Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,250 V with interrupting rating of 170 kA

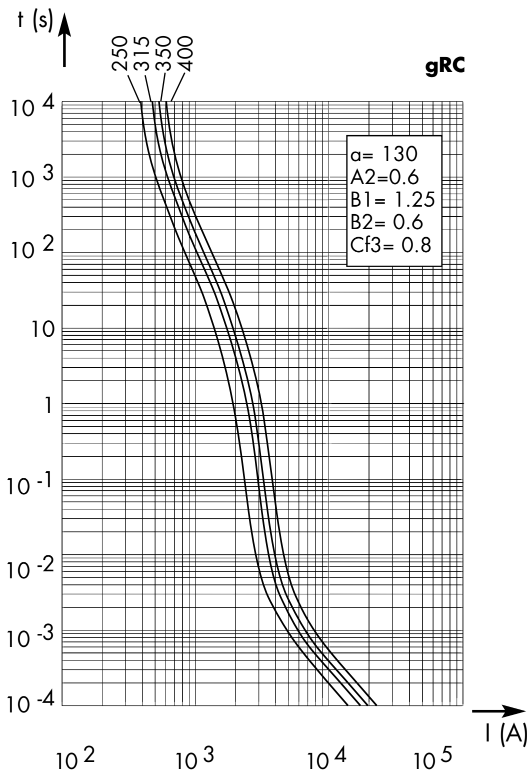
Peak arc voltage vs. working voltage



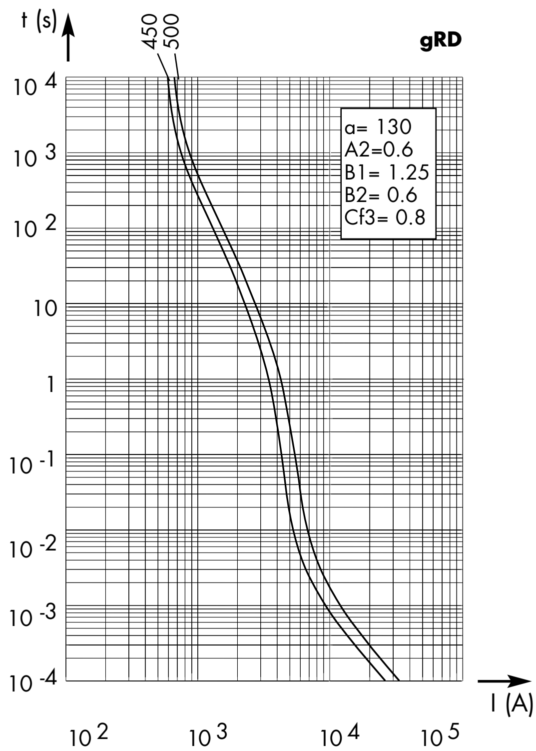
1: L/R = 100 ms
2: L/R = 40 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.



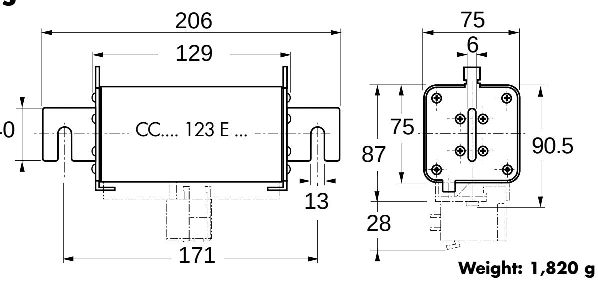
± 7% tolerance for mean pre-arcing current

Square-body Fuses 600-75V DC

660 - 750 V DC
gRB-gRC-gRD from 500 to 800 A
Size 123

Dimensions

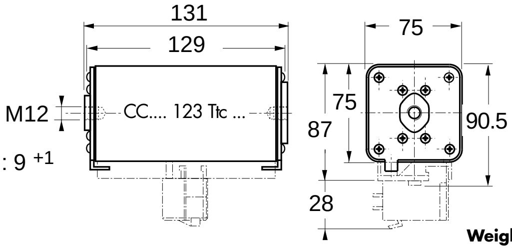
CC 7= 750 V
CC 6.6= 660 V



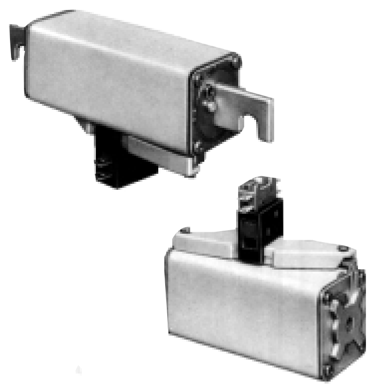
Weight: 1,820 g

CC 7= 750 V
CC 6.6= 660 V

Manageable depth: 9 $^{+1}$



Weight: 1,800 g



MAIN CHARACTERISTICS

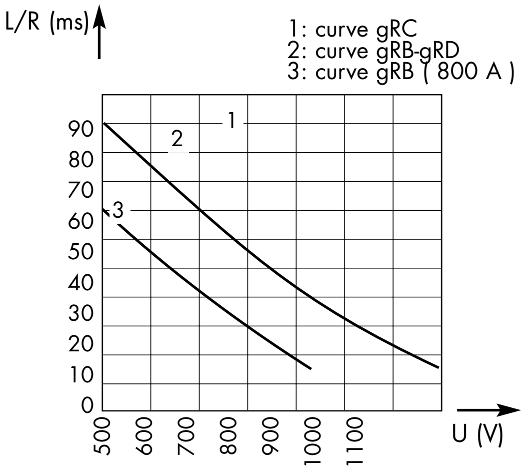
Size	Current rating I_N (A)	Interrupting rating	Maximum I2t (A^2s) @ 900 V = L/R 40 ms $I_P = 10\ I_N$	$I_P = 50\ I_N$	Watts losss 0.8 I_N	I_N	Catalog Number (1)	Ref. Number	Pack.
123	500 500	@ 750 V DC 100 kA L/R = 100 ms @ 900 V DC 100 kA L/R = 40 ms	5 10^6 5 10^6	1 10^6 1 10^6	51 51	93.5 93.5	CC 7,5 gRC 123 EF 0500 CC 7,5 gRC 123 TTF 0500	M089389 D090439	1 piece
			maximum I2t (A^2s) @ 800 V = L/R 40 ms $I_P = 10\ I_N$	$I_P = 50\ I_N$					
	630 700 750 630 700 750	@ 750 V DC 100 kA L/R = 50 ms	7.5 10^6 10 10^6 10 10^6 7.5 10^6 10 10^6 10 10^6	1.5 10^6 2 10^6 2 10^6 1.5 10^6 2 10^6 2 10^6	74 82 82 74 82 82	See max. operating current next page	CC 7,5 gRB 123 EF 0630 CC 7,5 gRB 123 EF 0700 CC 7,5 gRD 123 EF 0750 CC 7,5 gRB 123 TTF 0630 CC 7,5 gRB 123 TTF 0700 CC 7,5 gRD 123 TTF 0750	B098556 Q078191 F220943 C098557 F090441 H220945	1 piece
			maximum I2t (A^2s) @ 660 V = L/R 30 ms $I_P = 10\ I_N$	$I_P = 50\ I_N$					
	800 800	@ 660 V DC 100 kA L/R = 50 ms	12.15 10^6 12.15 10^6	2.6 10^6 2.6 10^6	90 90		CC 6.6 gRB 123 EF 0800 CC 6.6 gRB 123 TTF 0800	G220944 J220946	1 piece

Microswitch: MC 3E 1-5N Ref. Number: D310020 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 650-750V DC

ELECTRICAL CHARACTERISTICS

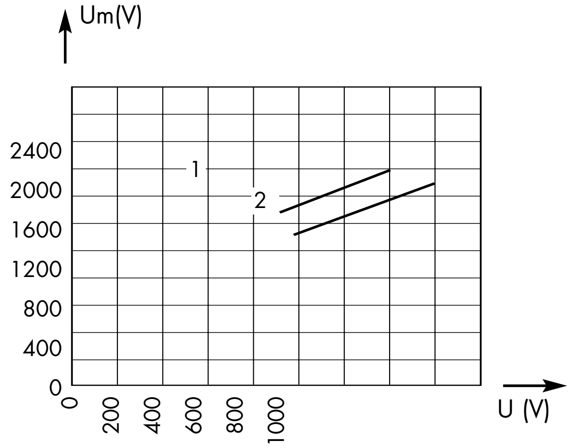
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,250 V with interrupting rating of 170 kA

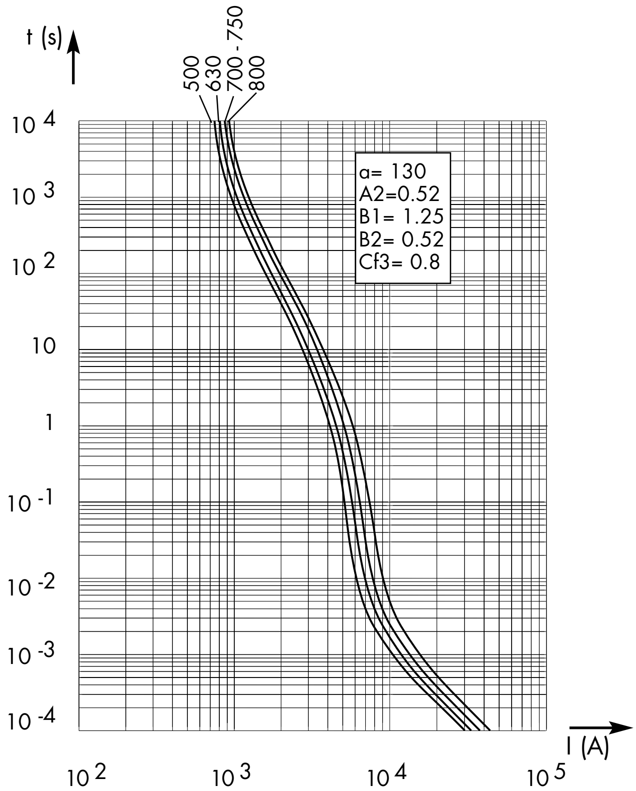
Peak arc voltage vs. working voltage



1: L/R = 100 ms
2: L/R = 40 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above: curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

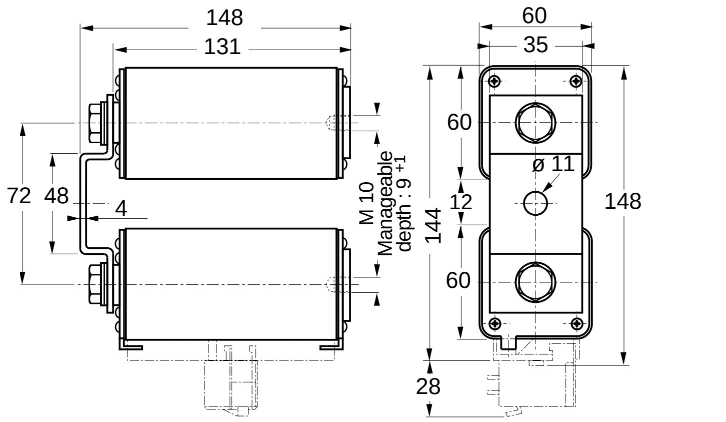
Current rating (A)	Maximum operating current (A)
630	550
700	600
750	600
800	650

± 7% tolerance for mean pre-arcing current

Square-body Fuses 750V DC

750 V DC
gRC - gRD from 500 to 900 A
Size 2x122

Dimensions



Weight: 2,825 g



MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Maximum I2t (A^2s) @ 900 V = L/R 40 ms		Watts loss		Catalog Number(1)	Ref number	Pack.
			$I_p = 10\ I_N$	$I_p = 50\ I_N$	0.8 I_N	I_N			
2x122	500	@ 900V DC 100 kA L/R = 40 ms	5 10^6	1 10^6	51	94	CC 7,5 gRC 2122 TTF 0500	Q 090473	1
	630		8 10^6	1.6 10^6	63	116	CC 7,5 gRC 2122 TTF 0630	R 090474	
	800		12.4 10^6	2.4 10^6	81	149	CC 7,5 gRC 2122 TTF 0800	S 090475	
	900		16 10^6	3.2 10^6	98	180	CC 7,5 gRD 2122 TTF 0900	T 220955	
			maximum I2t (A^2s) @ 800 V DC L/R 40 ms						
			$I_p = 10\ I_N$	$I_p = 50\ I_N$					
	1000	@ 750 V DC 100 kA L/R = 100 ms	25 10^6	4.8 10^6	104	190	CC 7,5 gRD 2122 TTF 1000	V 220956	1

Microswitch: MC 3E 1-5N Reference Number: D310020 (see page 423)

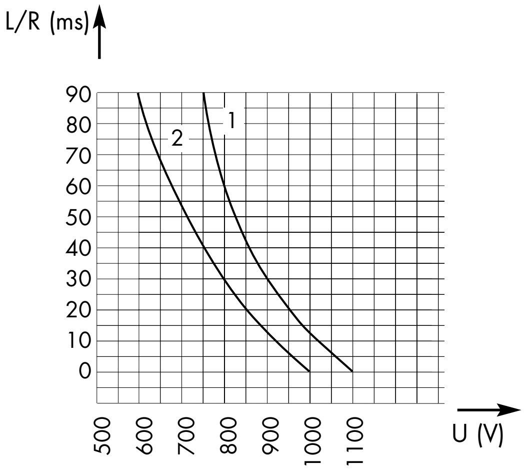
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 750V DC

ELECTRICAL CHARACTERISTICS

DC application data

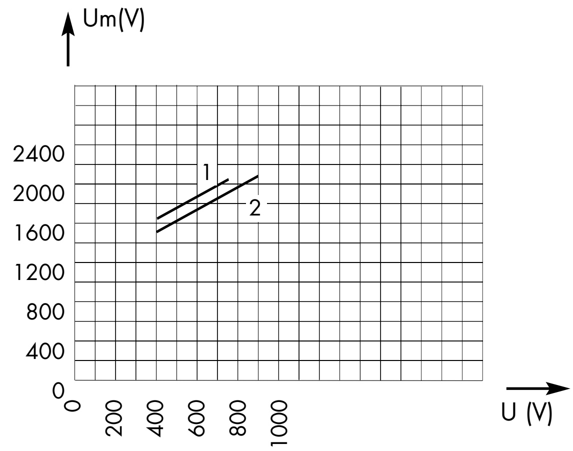


1 : curve gRC - gRD 900
2 : curve gRD 1000

Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,250 V with interrupting rating of 170 kA

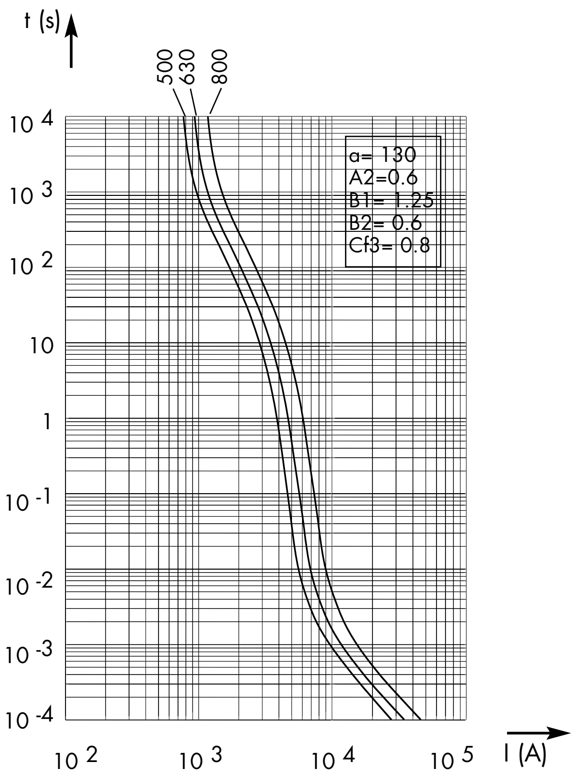
Peak arc voltage vs. working voltage

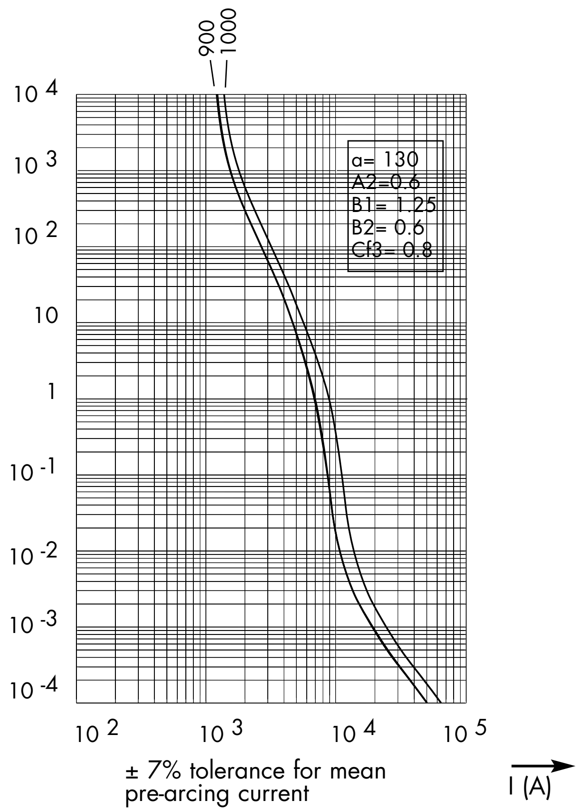


1 : L/R = 100 ms
2 : L/R = 40 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics





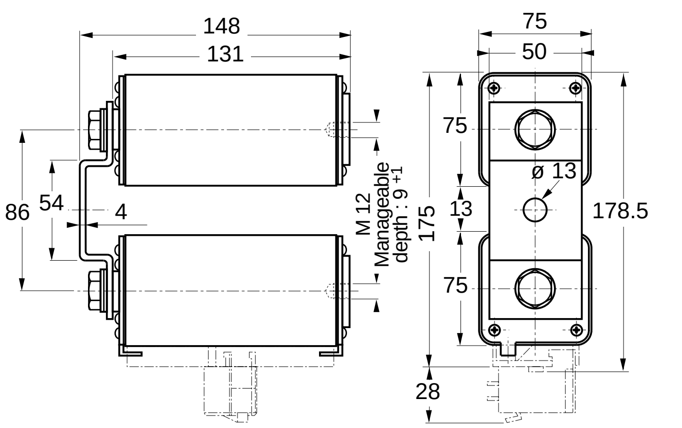
Above, left and right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

± 7% tolerance for mean pre-arcing current

Square-body Fuses 660-750V DC

660 - 750 V DC
gRC-gRB-gRD from 1000 to 1600 A
Size 2x123

Dimensions



Weight: 3,600 g



MAIN CHARACTERISTICS

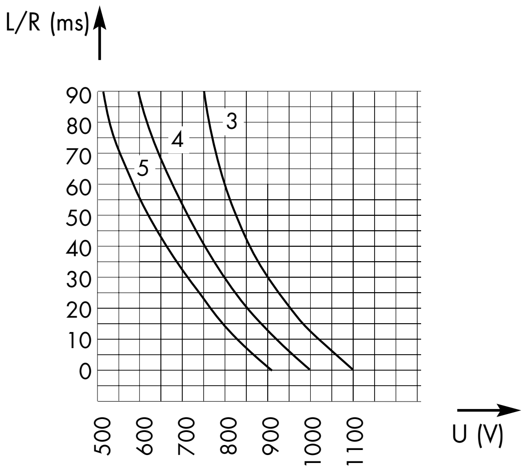
Size	Current rating I_N(A)	Interrupting rating	Maximum I2t (A^2s) @ 900 V = L/R 40 ms		Watts loss		Catalog Number(1)	Ref. Number	Pack.
			I_p = 10 I_N	I_p = 50 I_N	0.8 I_N	I_N			
2x123	1000	@ 750 V DC 100 kA L/R = 100 ms @ 900 V DC 100 KA L/R= 40 mS	20 10^6	4 10^6	102	187	CC 7,5 gRC 2123 TTF 1000	Z 090481	1
			maximum I2t (A^2s) @ 800 V = L/R 40 ms I_p = 10 I_N	I_p = 50 I_N					
	1250 1400 1500	@ 750 V DC 100 kA L/R = 50 ms	30 10^6 40 10^6 40 10^6	6 10^6 8 10^6 8 10^6	148 164 164		CC 7,5 gRB 2123 TTF 1250 CC 7,5 gRB 2123 TTF 1400 CC 7,5 gRD 2123 TTF 1500	D 098558 B 090483 K 220947	1
			maximum I2t (A^2s) @ 660 V = L/R 30 ms I_p = 10 I_N	I_p = 50 I_N					
	1600 (660 V)	@ 660 V DC 100 kA L/R = 50 ms	48.6 10^6	10 10^6	180		CC 6.6 gRB 2123 TTF 1600	L 220948	1

Microswitch: MC 3E 2-5N Reference Number: D310020 (see page 423)
((1) Catalog number to change in 2000

Square-body Fuses 660-750V DC

ELECTRICAL CHARACTERISTICS

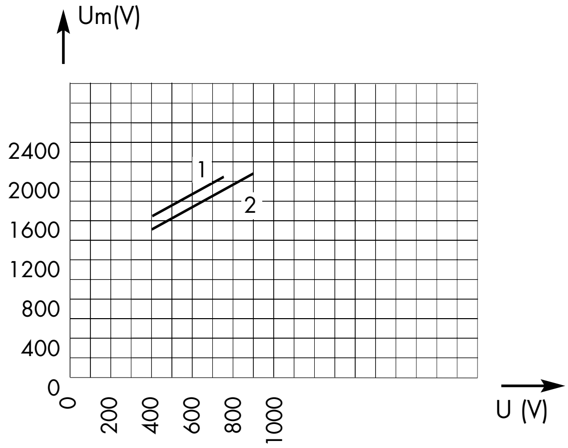
DC applications data



3: curve gRC
4: curve gRB
5: curvee gRD
Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage.

Max. AC voltage (50/60 Hz):
1,250 V with interrupting rating of 170 kA

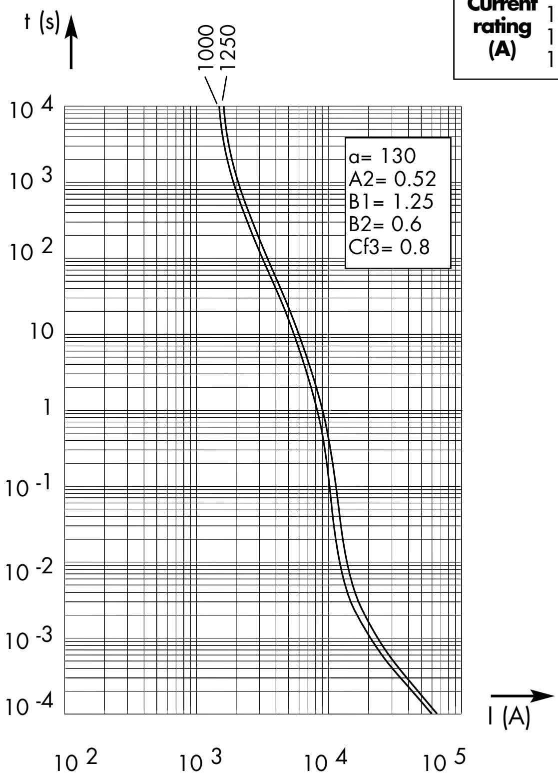
Peak arc voltage vs. working voltage



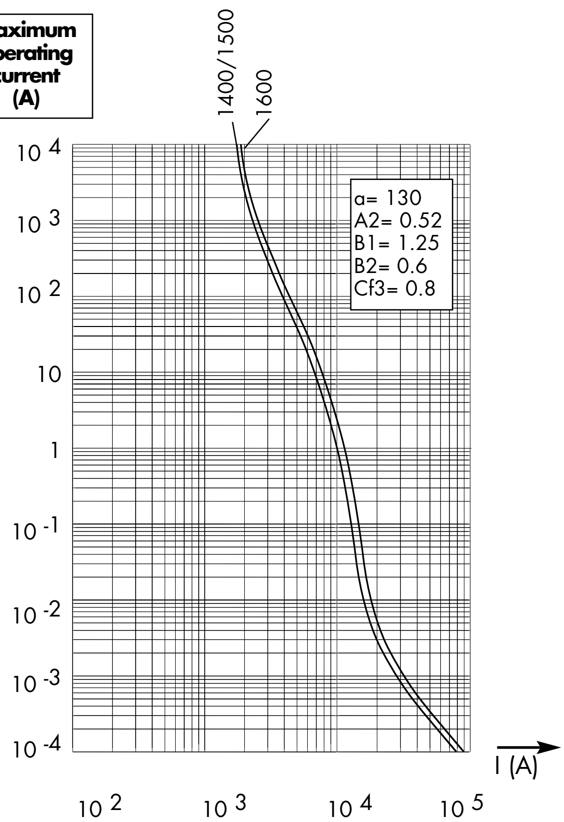
1: L/R = 100 ms
2: L/R = 40 ms
Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics

Current rating (A)	Maximum operating current (A)
1250	1100
1400	1200
1500	1200
1600	1300



Above, left and right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.



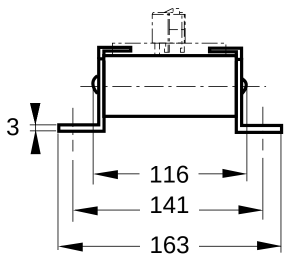
± 7% tolerance for mean pre-arcing current

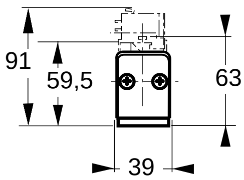
DC Fuses

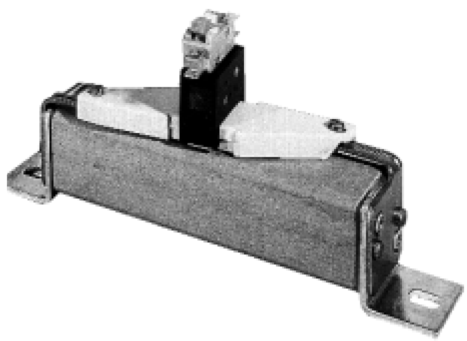
Square-body Fuses 1200V DC

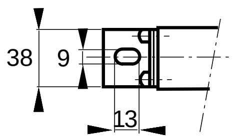
1200 V DC
SRF from 20 to 215A
Size 70

Dimensions









Weight: 550 g

MAIN CHARACTERISTICS

Size	Current Rating I_N (A)	Interrupting Rating	Maximum I2t @ 1000 V =		Watts loss		Catalog Number(1)	Ref. Number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
70	20	@ 1200 V= 100 kA L/R = 15 ms	180	310	4.5	10	CC 12 SRF 70 QF 0020	C076638	1 piece
	25		180	310	7	15.5	CC 12 SRF 70 QF 0025	S079435	
	32		350	610	8.5	18.5	CC 12 SRF 70 QF 0025	T079436	
	40		580	1000	10	22	CC 12 SRF 70 QF 0040	V079437	
	50		1030	1800	12	26	CC 12 SRF 70 QF 0050	W079438	
	63		1600	2800	15	33	CC 12 SRF 70 QF 0063	X079439	
	80		3100	5400	18.5	37.5	CC 12 SRF 70 QF 0080	Y079440	
	100		5800	10000	21.5	44.5	CC 12 SRF 70 QF 0100	Z079441	
	125		9200	16000	28	54	CC 12 SRF 70 QF 0125	A079442	
	160		19200	33200	34	64	CC 12 SRF 70 QF 0160	B079443	
	200		45000	78500	35	65.5	CC 12 SRF 70 QF 0200	C079444	
	215		55000	95000	46	89	CC 12 SRF 70 QF 0215	D079445	

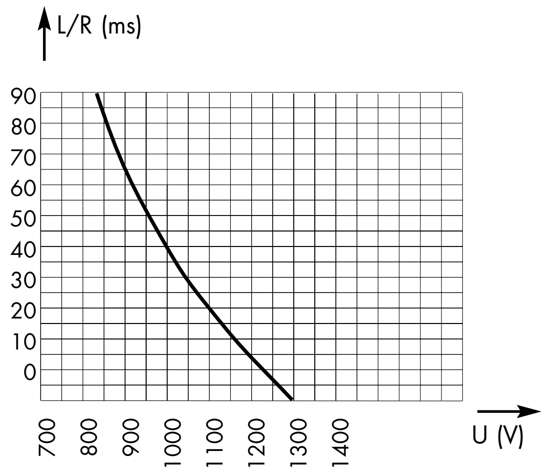
Microswitch: MC 3E 1-5N Ref. Number : D310020 (see page 423)
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 1200V DC

ELECTRICAL CHARACTERISTICS

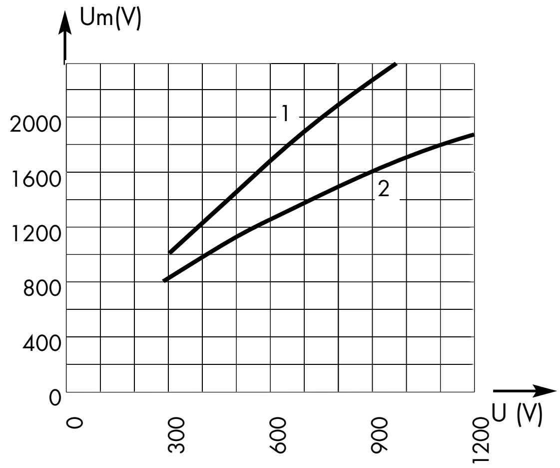
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
900 V with interrupting rating of 100 kA

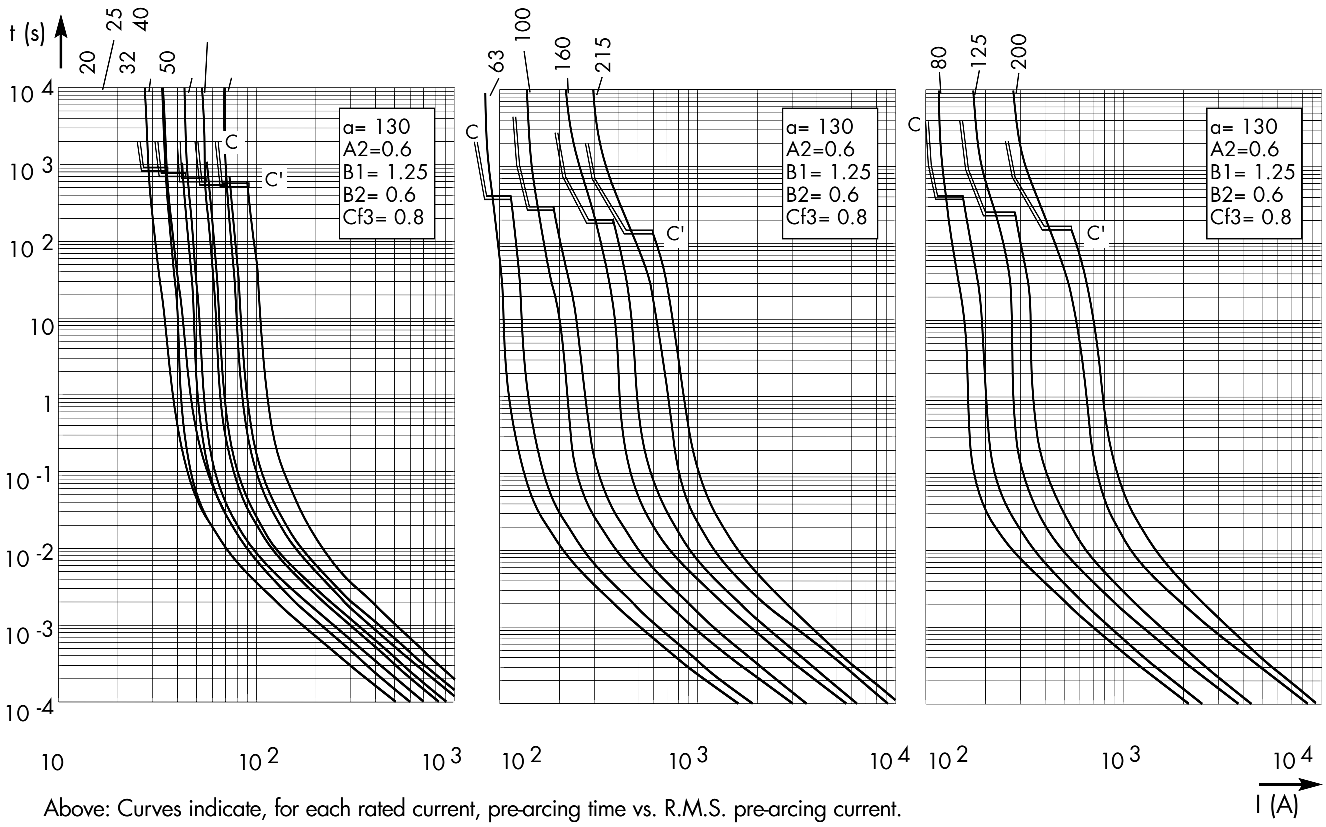
Peak arc voltage vs. working voltage



1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage,which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

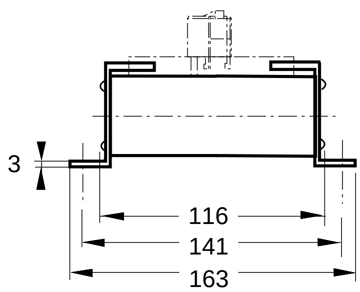
Semiconductor Fuses

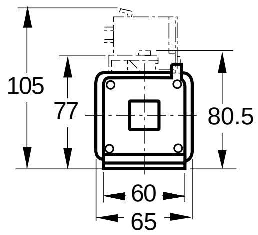
DC Fuses

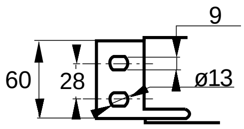
Square-body Fuses 1200V DC

1200 V DC
SRG from 160 to 420 A
Size 72

Dimensions







weight : 1,151 g



MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 1000 V =		Watts loss		Catalog Number (1)	Ref. number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
72	160 200 250 315 400 420	@ 1200 V= 100 kA L/R = 15 ms	12000 21000 45500 90000 182000 220000	20000 36000 78500 154000 314000 380000	41 48 57 60 66 67	77.5 88 96 110 129 131	CC 12 SRG 72 QF 0160 CC 12 SRG 72 QF 0200 CC 12 SRG 72 QF 0250 CC 12 SRG 72 QF 0315 CC 12 SRG 72 QF 0400 CC 12 SRG 72 QF 0420	K079428 L079429 M079430 N079431 P079432 Q079433	1

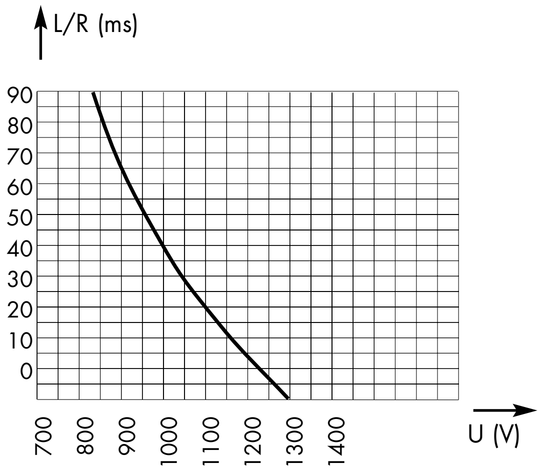
Microswitch: MC 3E 1-5N Ref. Number: D310020 (see page 423)
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 1200V DC

ELECTRICAL CHARACTERISTICS

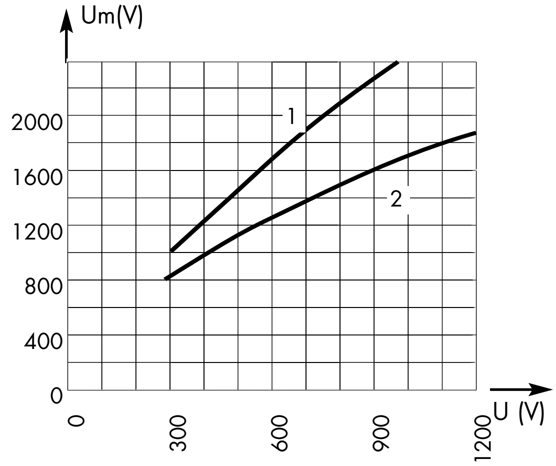
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltag

Max. AC voltage (50/60 Hz):
900 V with interrupting rating of 100 kA

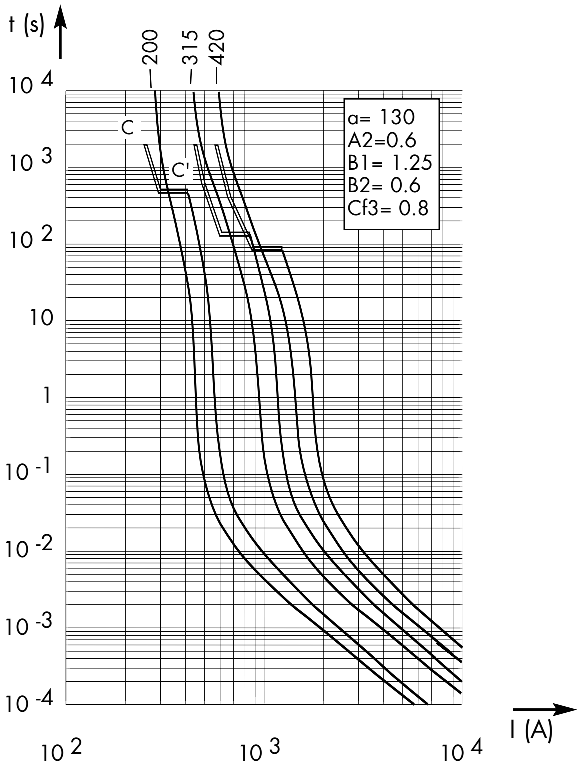
Peak arc voltage vs. working voltage

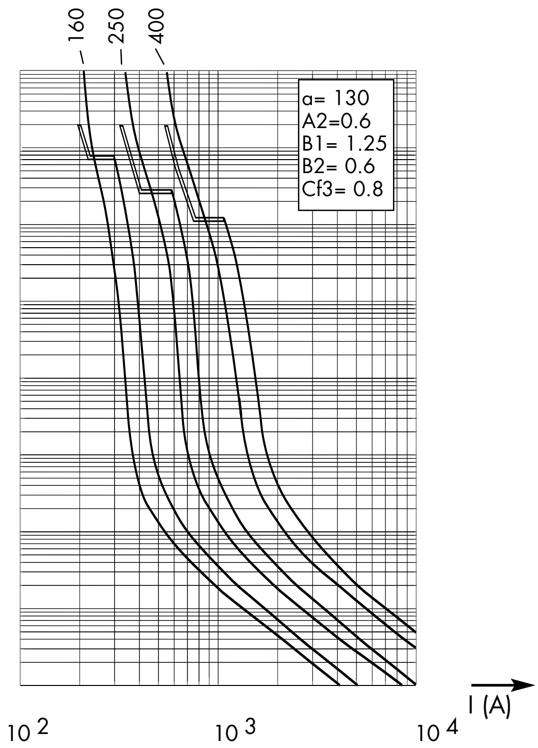


1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across the fuse terminals, vs. DC working voltage

Time vs. current characteristics



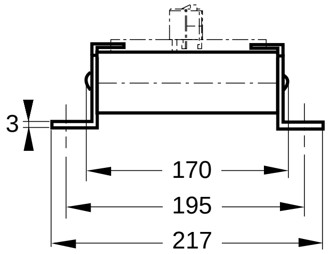


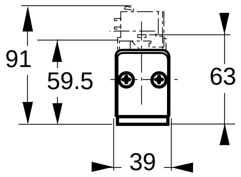
Above, left and right: These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

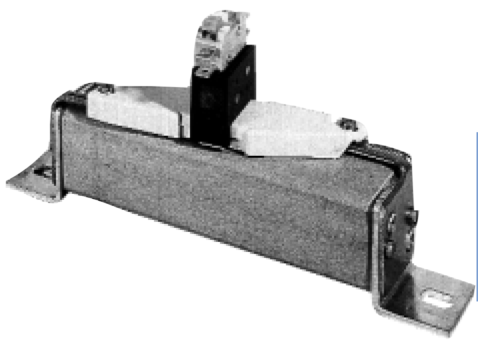
Square-body Fuses 2000V DC

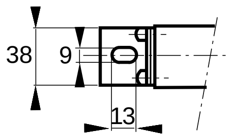
2000 V DC
SRC from 20 to 215 A
Size 120

Dimensions









Weight : 745 g

MAIN CHARACTERISTICS

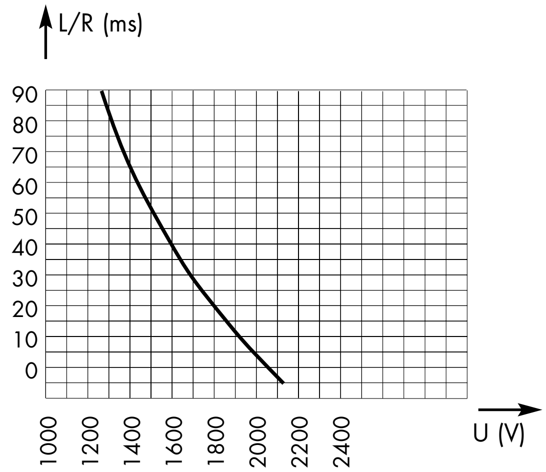
Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 1600 V =		Watts loss		Catalog Number (1)	Ref. number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
120	20	@ 2000 V= 100 kA L/R = 15 ms	180	310	8	16	CC 20 SRC 120 QF 0020	J079450	1 piece
	25		180	310	12.5	25	CC 20 SRC 120 QF 0025	K079451	
	32		350	610	14.5	29.5	CC 20 SRC 120 QF 0032	L079452	
	40		580	1000	17.5	36	CC 20 SRC 120 QF 0040	M079453	
	50		1030	1800	20.5	42	CC 20 SRC 120 QF 0050	N079454	
	63		1600	2800	26	53.5	CC 20 SRC 120 QF 0063	P079455	
	80		3100	5400	30	61.5	CC 20 SRC 120 QF 0080	Q079456	
	100		5800	10000	35	70.5	CC 20 SRC 120 QF 0100	R079457	
	125		9200	16000	43	87.5	CC 20 SRC 120 QF 0125	S079458	
	160		19200	33200	49	99	CC 20 SRC 120 QF 0160	T079459	
	200		45000	78500	49.5	101	CC 20 SRC 120 QF 0200	U079460	
	215		55000	95000	52	106	CC 20 SRC 120 QF 0215	W079461	

Microswitch: MCR 3E 1-5N BS Ref. Number : G310023 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses — 2000V DC

ELECTRICAL CHARACTERISTICS

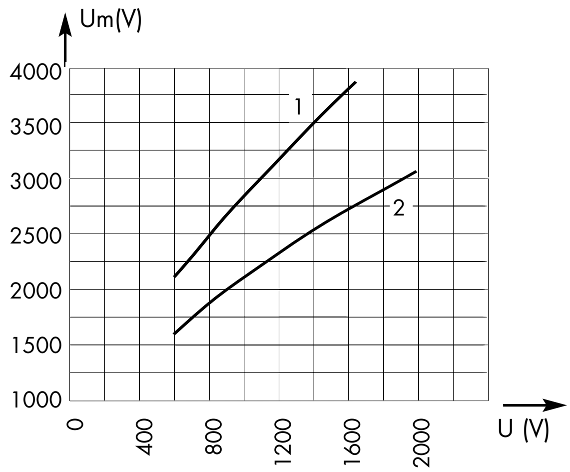
DC application data



Above: Curve indicates the maximum permissible value of time constant L/R as a function of the DC working voltage

Max. AC voltage (50/60 Hz):
1,500 V with interrupting rating of 100 kA

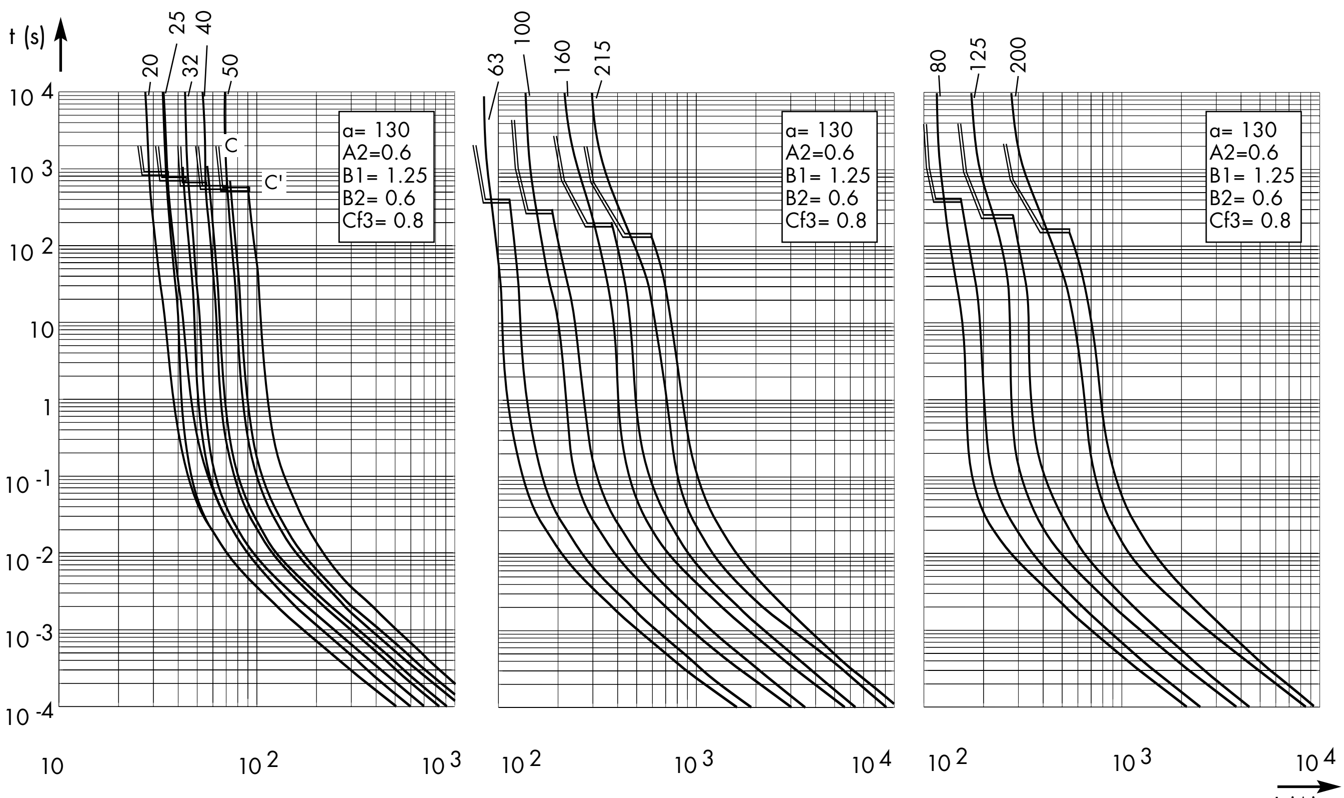
Peak arc voltage vs. working voltage



1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across the fuse terminals, vs. DC working voltage

Time vs. current characteristics

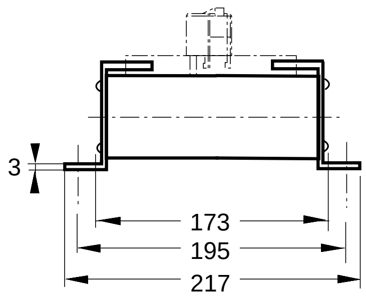


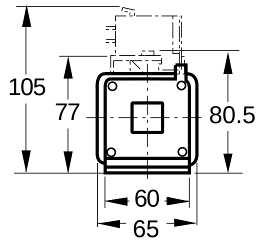
Above, left to right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

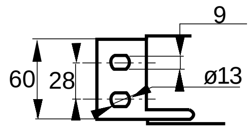
Square-body Fuses 2000V DC

2000 V DC
SRD from160 to 400 A
Size 122

Dimensions







Weight : 1,539 g



MAIN CHARACTERISTICS

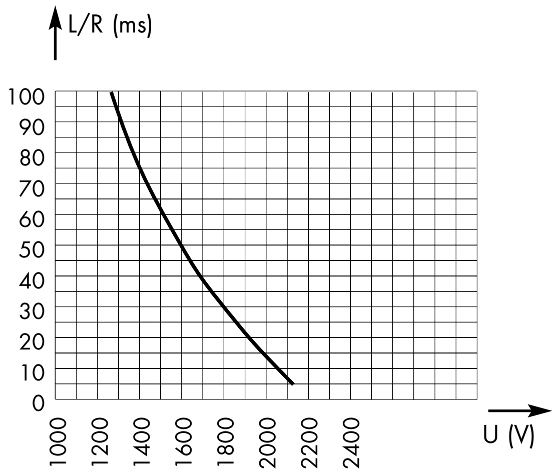
Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 1600 V =		Watts loss		Catalog Number (1)	Ref. number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
122	160 200 250 315 400	@ 1800 V DC 100 kA L/R = 30 ms @ 2000 V DC 100k A L/R = 15 ms	15000 26000 50000 117000 219000	25000 44000 87000 200000 380000	52.5 61.5 69 74 87	100 118 131 150 175	CC 20 SRD 122 QF 0160 CC 20 SRD 122 QF 0200 CC 20 SRD 122 QF 0250 CC 20 SRD 122 QF 0315 CC 20 SRD 122 QF 0400	D076639 X079462 Y079463 Z079464 A079465	1 piece

Microswitch: MCR 3E 1-5N BS Ref. Number: G310023 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 2000V DC

ELECTRICAL CHARACTERISTICS

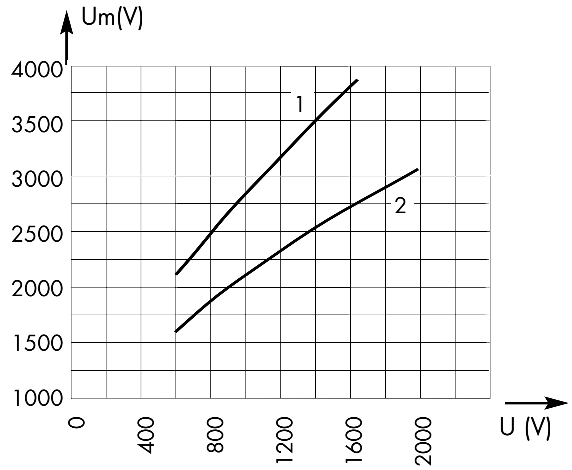
DC applications data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,500 V with interrupting rating of 100 kA

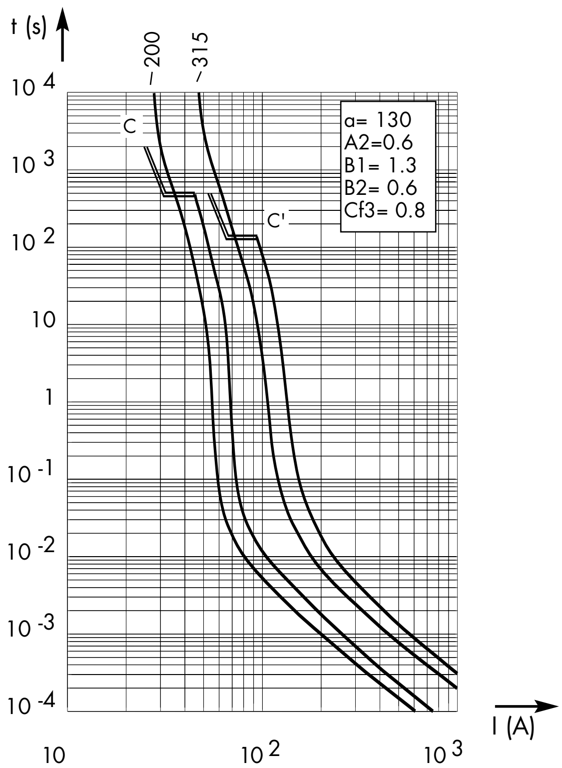
Peak arc voltage vs. working voltage

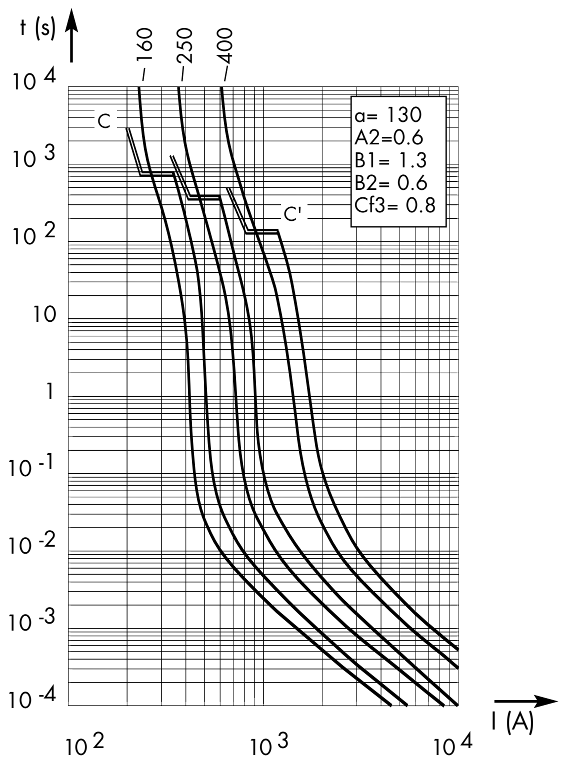


1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics





Above, left and right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

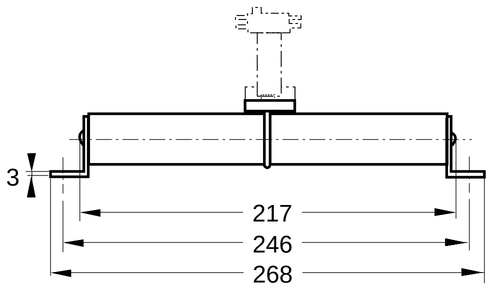
Semiconductor Fuses

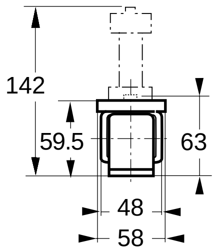
DC Fuses

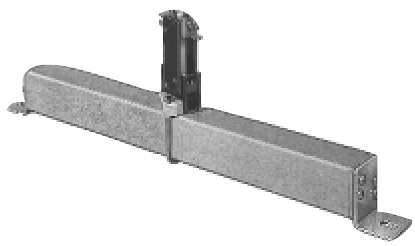
Square-body Fuses 1750-2000V DC

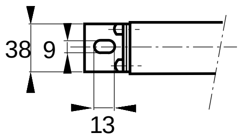
1750 - 2000 V DC
gRC-gRE from 6 to 125 A
Size 300

Dimensions









Weight: 890 g

MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number (1)	Ref. number	Pack.
300	6	@ 1750 V DC 30 kA L/R = 30 ms	3.4	6	CC 17,5 gRC 300 QF 0006	P083733	1 piece
	8		4.4	8	CC 17,5 gRC 300 QF 0008	Q083734	
	10		5.8	10.6	CC 17,5 gRC 300 QF 0010	M089435	
	12		6	11	CC 17,5 gRC 300 QF 0012	R087898	
	16		6.7	12	CC 17,5 gRC 300 QF 0016	N089436	
	20	@ 2000 V DC 30 kA L/R = 30 ms	7.9	14	CC 20 gRC 300 QF 0020	R086932	1 piece
	25		10	18	CC 20 gRC 300 QF 0025	S086933	
	32		13.5	24	CC 20 gRC 300 QF 0032	T086934	
	40		16	29	CC 20 gRC 300 QF 0040	V086935	
	50		19	34	CC 20 gRC 300 QF 0050	W086936	
	63		23.5	42.5	CC 20 gRC 300 QF 0063	X086937	
	80		28.5	51.5	CC 20 gRC 300 QF 0080	Y086938	
	80	@ 2000 V DC 30 kA L/R = 14 ms @ 1800 V= 100 kA L/R = 20 ms	22	40	CC 20 gRE 300 QF 0080	P075752	1 piece
	100		28	50	CC 20 gRE 300 QF 0100	Q075753	
	125		30	55	CC 20 gRE 300 QF 0125	R075754	

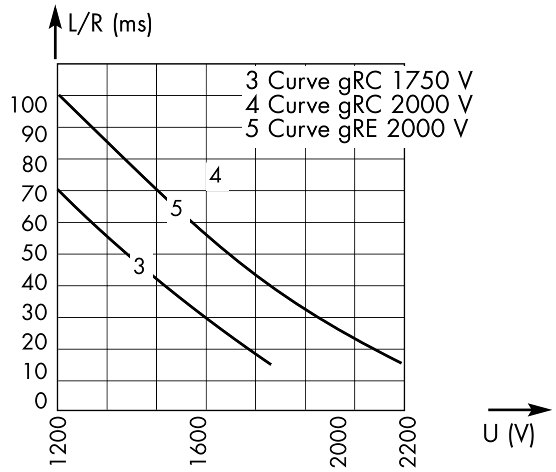
Microswitch: MC R 3E 1-5N Ref. Number: G310023 (see page 423)
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 1750-2000V DC

ELECTRICAL CHARACTERISTICS

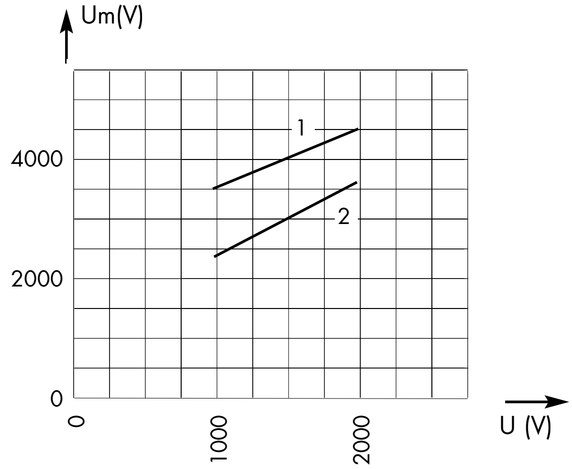
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,700 V with interrupting rating of 80 kA

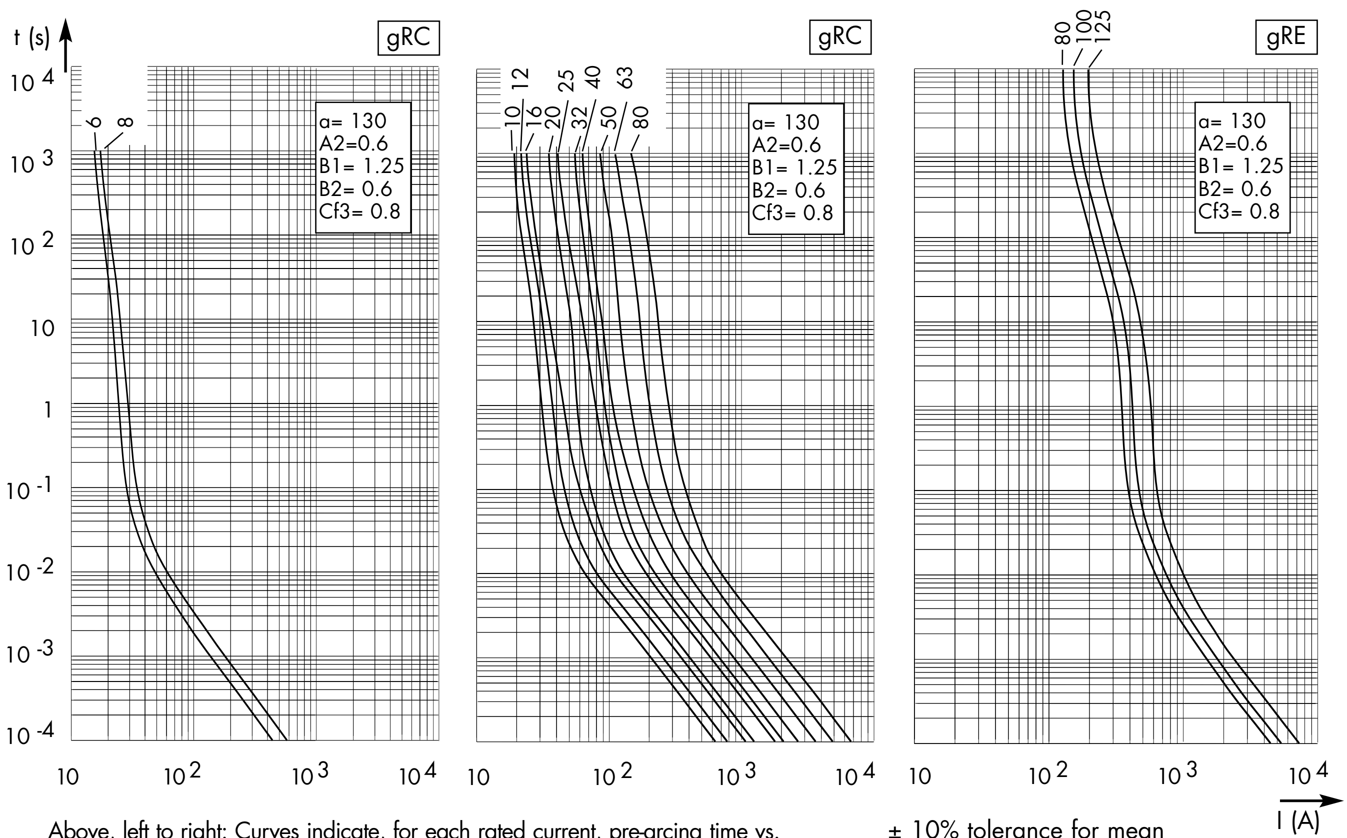
Peak arc voltage vs. working voltage



1 Curve gRC : L/R = 30 ms
2 Curve gRE : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above, left to right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

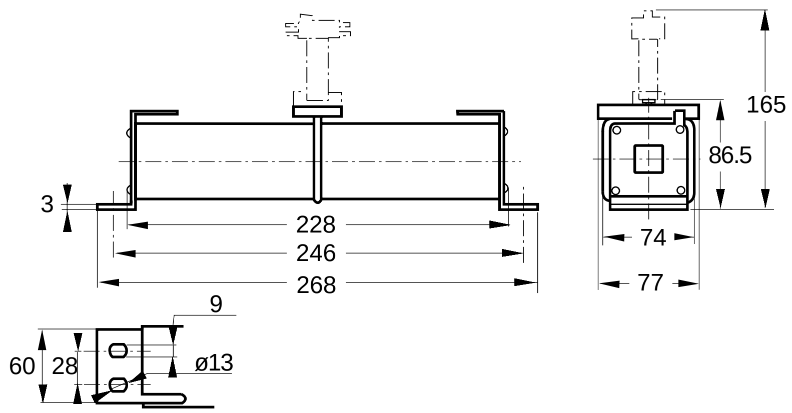
± 10% tolerance for mean pre-arcing current

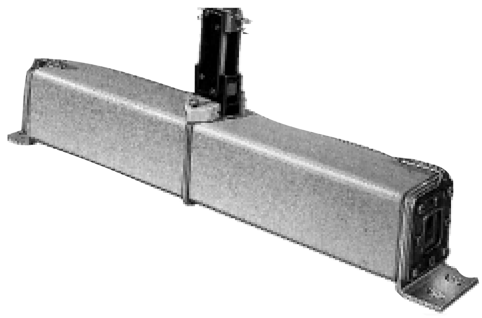
DC Fuses

Square-body Fuses 2000V DC

2000 V DC
gRC-gRE from 100 to 280 A
Size 302

Dimensions





Weigth : 1,830 g

MAIN CHARACTERISTICS

Size	Current rating I_N(A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number (1)	Ref. number	Pack.
302	100 125 160	@ 2000 V DC 30 kA L/R = 30 ms	30 37 47.5	58.5 72 93	CC 20 gRC 302 QF 0100 CC 20 gRC 302 QF 0125 CC 20 gRC 302 QF 0160	N086929 P086930 Q086931	1 piece
	160 200 250 280	@ 2000 V DC 30 kA L/R = 14 ms @ 1800 V DC 100 kA L/R = 20 ms	42 48 57 60	70 80 95 100	CC 20 gRE 302 QF 0160 CC 20 gRE 302 QF 0200 CC 20 gRE 302 QF 0250 CC 20 gRE 302 QF 0280	S075755 T075756 V075757 W075758	1 piece

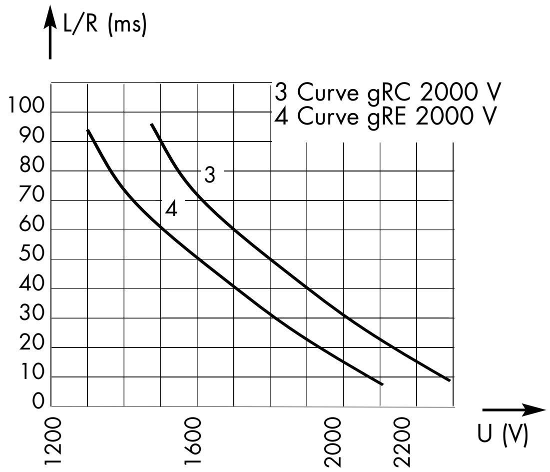
Microswitch MC 2R 3E 1-5N BS Reference number: J310025 (see page 423)
(1) Catalog number to change in 2000

Ferraz Shawmut

Square-body Fuses 2000V DC

ELECTRICAL CHARACTERISTICS

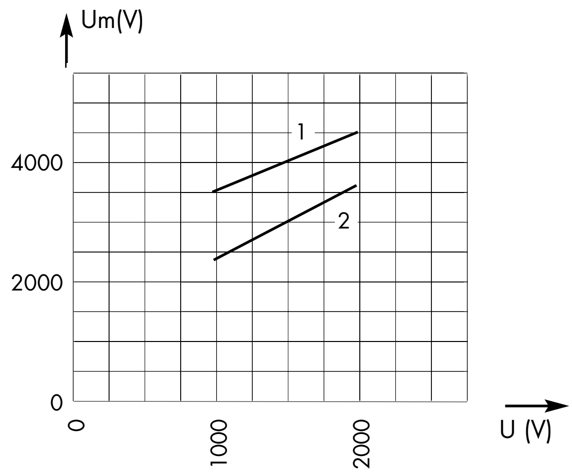
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
1,700 V with interrupting rating of 80 kA

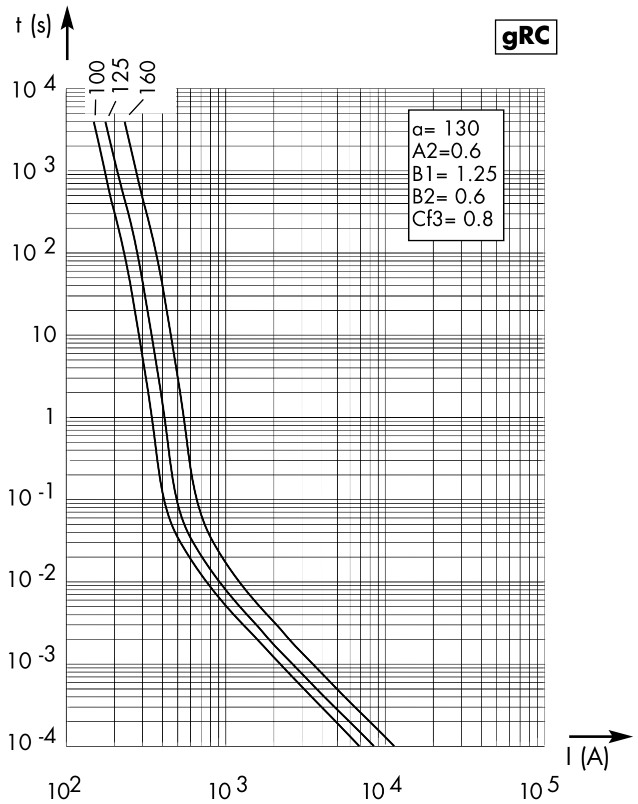
Peak arc voltage vs. working voltage

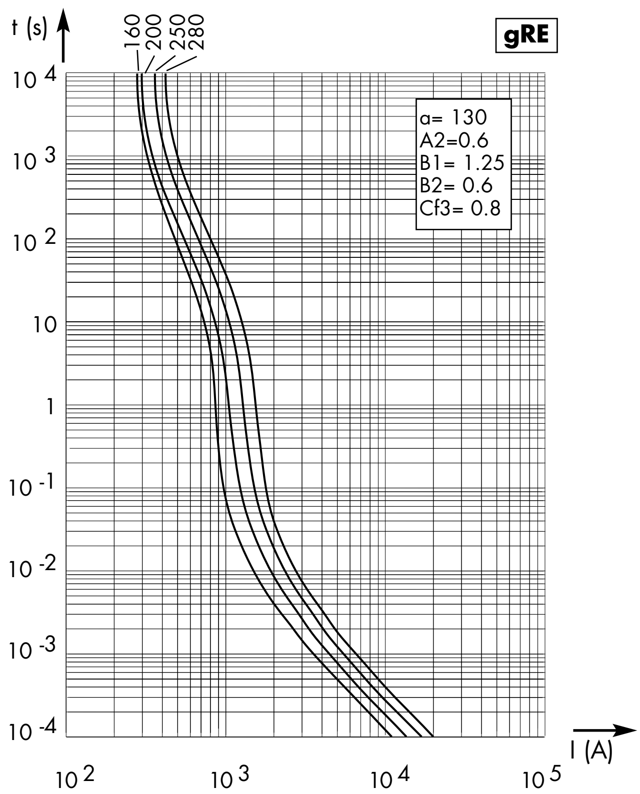


1 Curve gRC : L/R = 30 ms
2 Curve gRE : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across the fuse terminals, vs. DC working voltage

Time vs. current characteristics





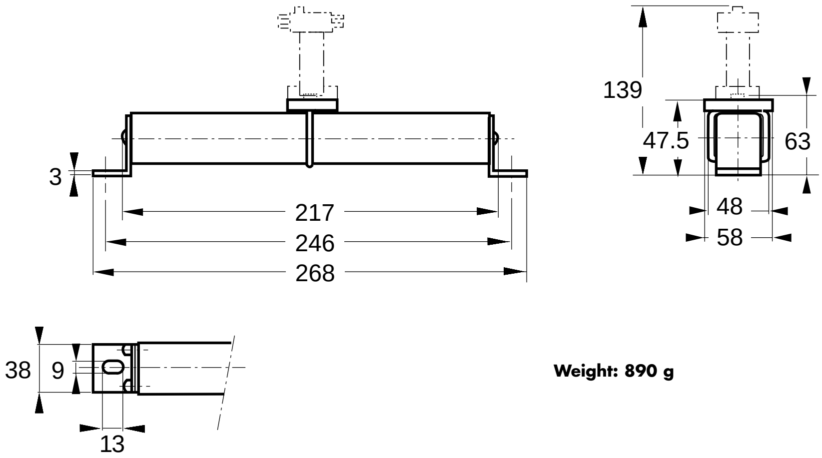
Above, left and right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

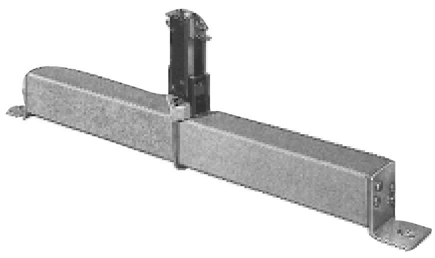
±10% tolerance for mean pre-arcing current

Square-body Fuses 2400V DC

2400 V DC
SRE from 20 to 180 A
Size 300

Dimensions





Weight: 890 g

MAIN CHARACTERISTICS

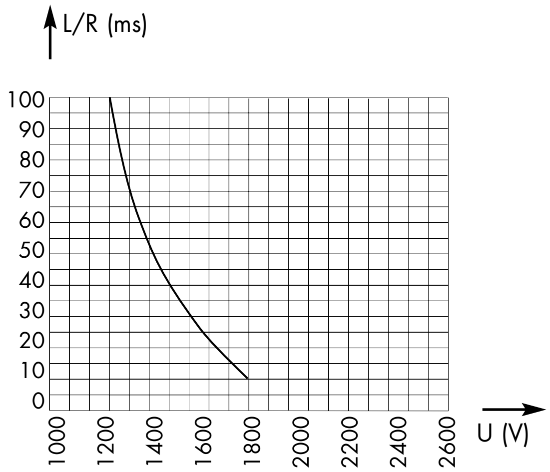
Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 1000 V =		Watts loss		Catalog Number (1)	Ref. Number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
300	20	@ 2400 V DC 100 kA L/R = 15 ms	150	260	18	36	CC 24 SRE 300 QF 0020	X075299	1 piece
	25		260	460	21	42	CC 24 SRE 300 QF 0025	W075298	
	32		310	540	22	43	CC 24 SRE 300 QF 0032	G079471	
	40		530	920	26	51	CC 24 SRE 300 QF 0040	H079472	
	50		750	1300	32	62	CC 24 SRE 300 QF 0050	J079473	
	63		1650	2900	35	69	CC 24 SRE 300 QF 0063	K079474	
	80	@ 2000 V DC 100 kA L/R = 45 ms	3700	6500	38	75	CC 24 SRE 300 QF 0080	L079475	
	100		8000	14000	41	80	CC 24 SRE 300 QF 0100	M079476	
	125		14000	25000	49	95	CC 24 SRE 300 QF 0125	N079477	
	160		34000	60000	50	96	CC 24 SRE 300 QF 0160	P079478	
	180		57000	100000	51	98	CC 24 SRE 300 QF 0180	Q079479	

MC 2R 3E 1-5N BS Microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 2400V DC

ELECTRICAL CHARACTERISTICS

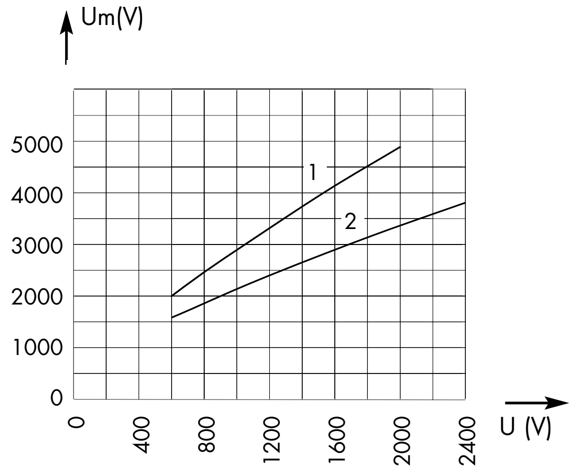
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
2000 V with interrupting rating of 80 kA

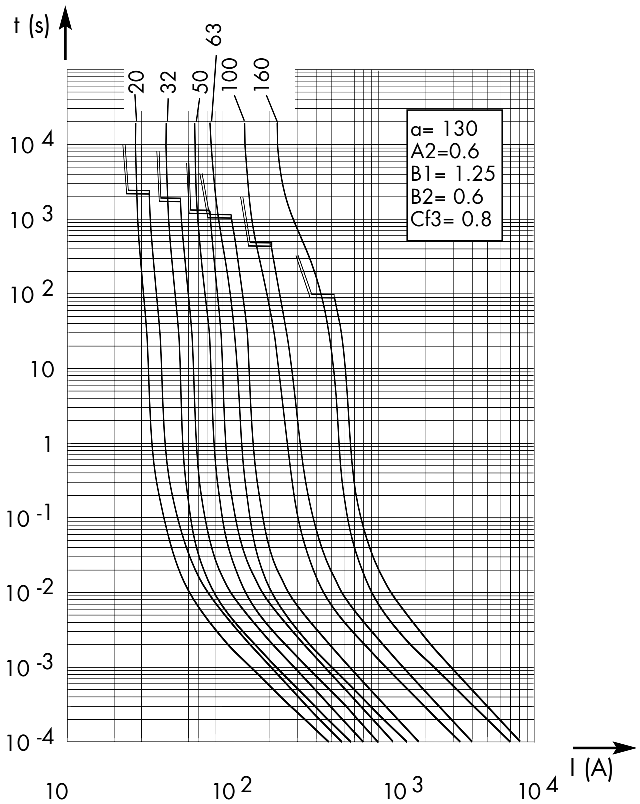
Peak arc voltage vs. working voltage

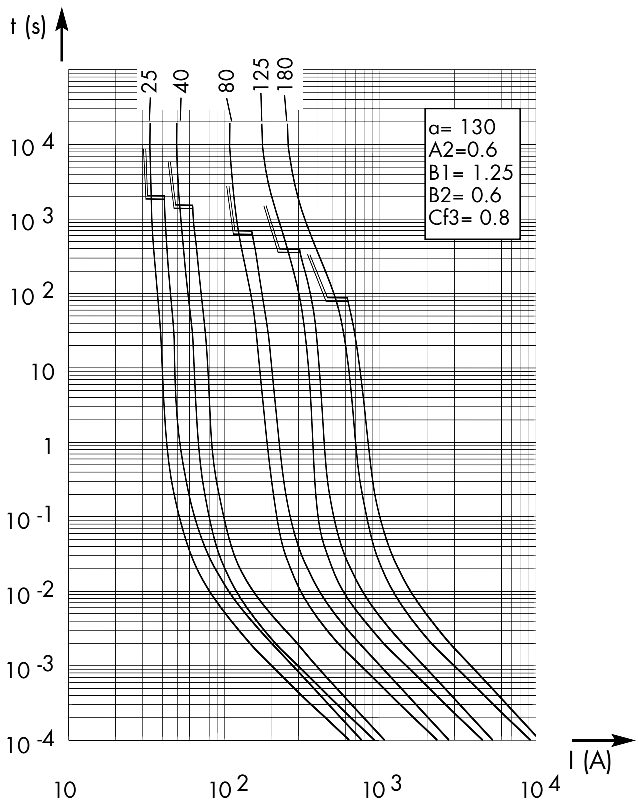


1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



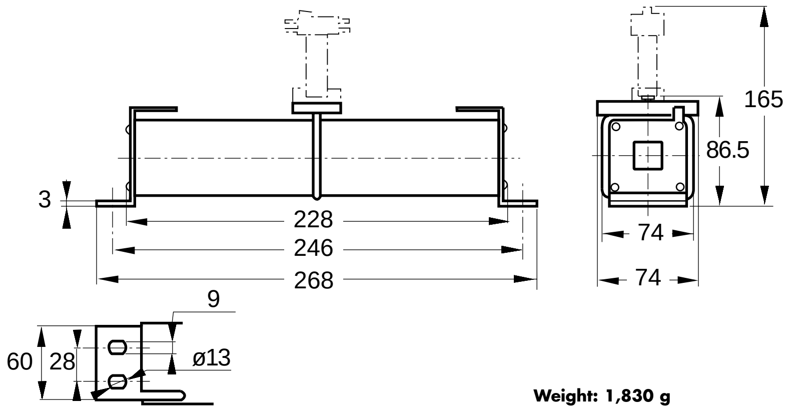


Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

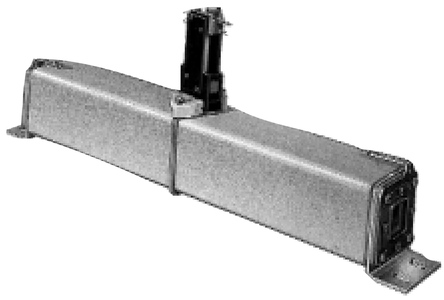
Square-body Fuses 2400V DC

2400 V DC
SRD - SRF from 160 to 400 A
Size 302

Dimensions



Weight: 1,830 g



MAIN CHARACTERISTICS

Size	Current rating I_N (A)	Interrupting rating	Maximum I2t @ 1000 V =		Watts loss		Catalog Number (1)	Ref. Number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
302	160 200 250 315 350 400	@ 2400 V DC 100 kA L/R = 15 ms @ 2000 V DC 100 kA L/R = 45 ms	18,500 38,000 68,000 150,000 230,000 195,000	32,000 66,000 120,000 250,000 400,000 325,000	71 76 90 94 95 96	142 149 179 186 187 188	CC 24 SRD 302 QF 0160 CC 24 SRD 302 QF 0200 CC 24 SRD 302 QF 0250 CC 24 SRD 302 QF 0315 CC 24 SRD 302 QF 0350 CC 24 SRD 302 QF 0400	J 076644 R079480 S079481 T079482 V079483 V075297	1 piece

MC 2R 3E 1-5N BS Microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

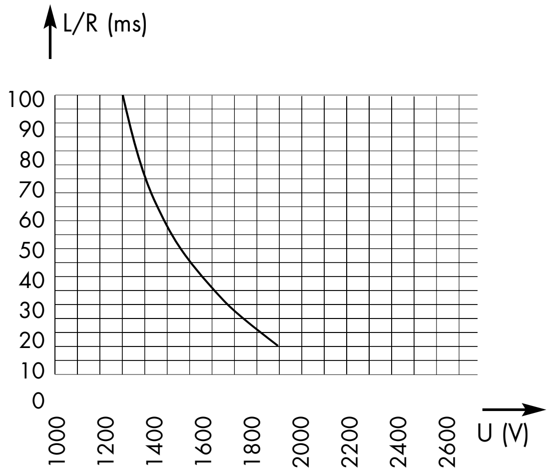
Semiconductor Fuses

DC Fuses

Square-body Fuses 2400V DC

ELECTRICAL CHARACTERISTICS

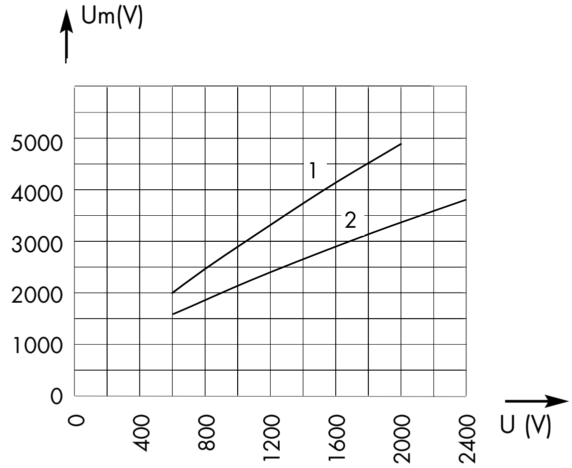
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
2,000 V with interrupting rating of 80 kA

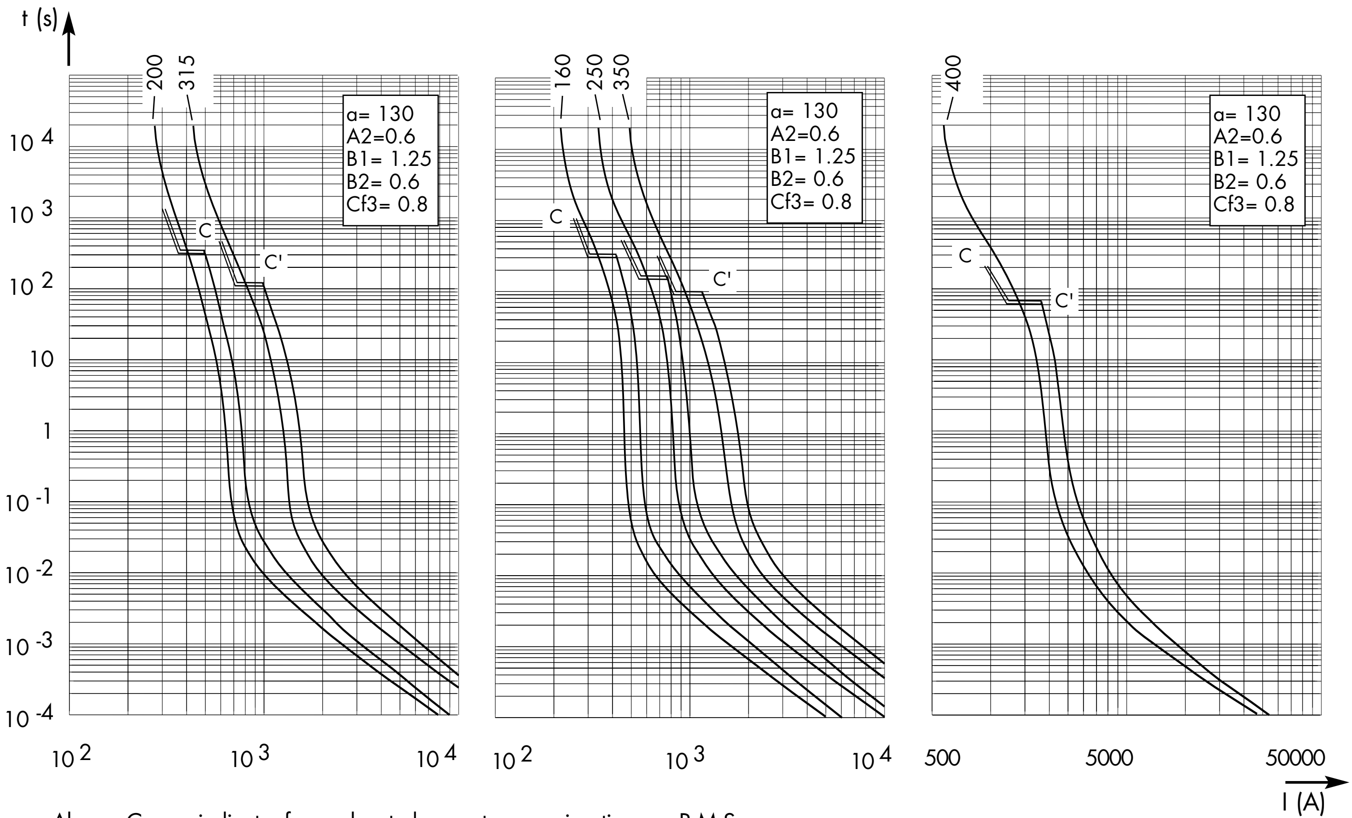
Peak arc voltage vs. working voltage



1 : L/R = 45 ms
2 : L/R = 15 ms

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics

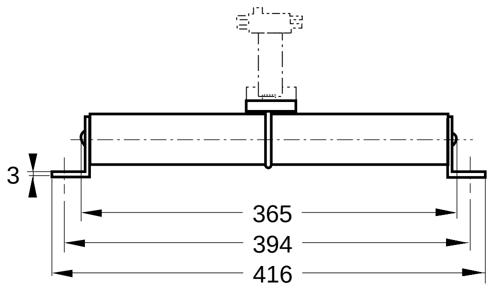


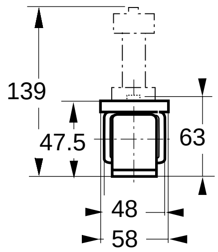
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

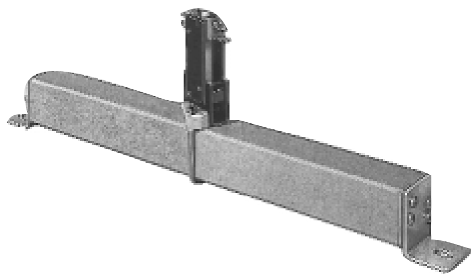
Square-body Fuses 3500-4000V DC

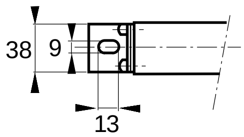
3500-4000 V DC
gRB-gRD from 6 to 125 A
Size 600

Dimensions









Weight: 1,445 g

MAIN CHARACTERISTICS

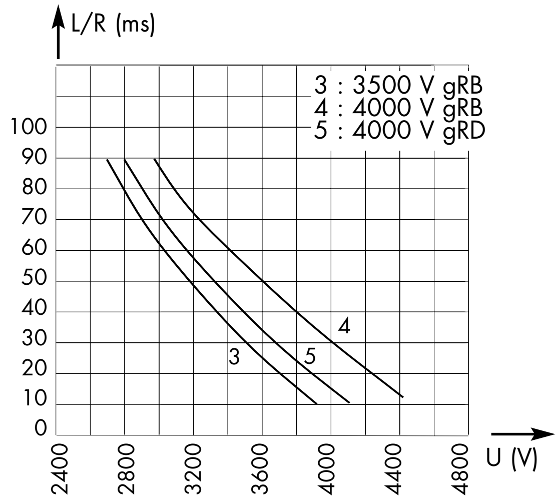
Size	Current rating I_N(A)	Interrupting rating	Watts losss 0.8 I_N	Watts losss I_N	Catalog Number (1)	Ref. Number	Pack.
600	6	@ 3500 V DC 30 kA L/R = 30 ms	5.3	9.5	CC 35 gRB 600 QF 0006	S083736	1 piece
	8		7	12.7	CC 35 gRB 600 QF 0008	R083735	
	10		10.2	18.5	CC 35 gRB 600 QF 0010	N089390	
	12		11	20	CC 35 gRB 600 QF 0012	V082220	
	16		13.1	24	CC 35 gRB 600 QF 0016	P089391	
	20		14	25.4	CC 35 gRB 600 QF 0020	Q089392	
	25		18	32.5	CC 35 gRB 600 QF 0025	R089393	
	32	@ 4000 V DC 30 kA L/R = 30 ms	25.5	46	CC 40 gRB 600 QF 0032	A086963	1 piece
	40		35	63	CC 40 gRB 600 QF 0040	B086964	
	50		29	52	CC 40 gRB 600 QF 0050	C086965	
	63		42	76.5	CC 40 gRB 600 QF 0063	D086966	
	80		51	92	CC 40 gRB 600 QF 0080	E086967	
	80	@ 4000 V DC 30 kA L/R = 30 ms	39	67	CC 40 gRD 600 QF 0080	B075763	1 piece
	100		50.5	88	CC 40 gRD 600 QF 0100	C075764	
	125		63	110	CC 40 gRD 600 QF 0125	D075765	

MC 2R 3E 1-5NBS microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 3500-4000V DC

ELECTRICAL CHARACTERISTICS

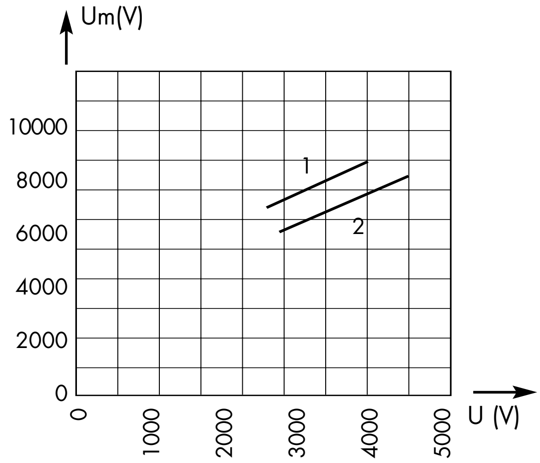
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3,600 V with interrupting rating of 30 kA

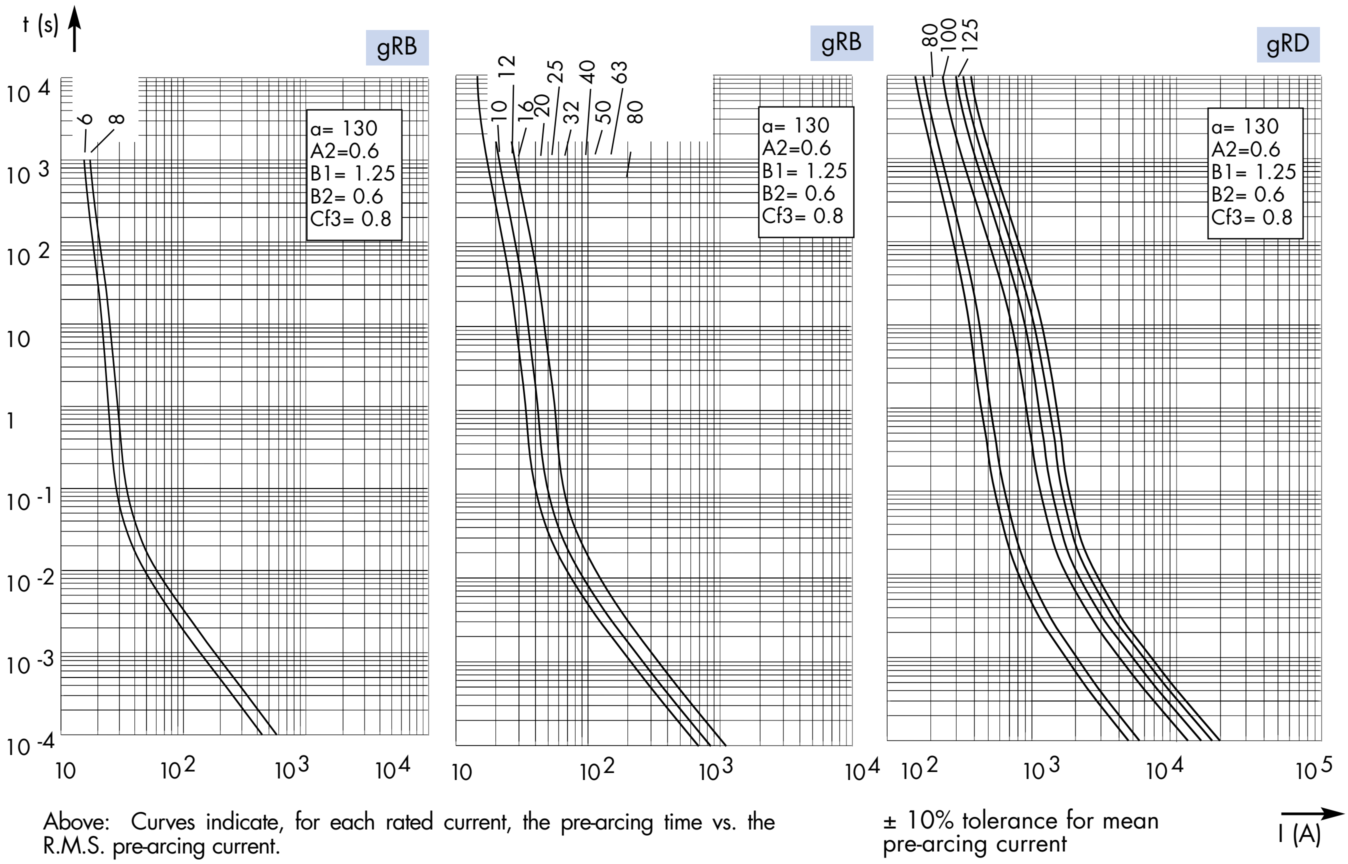
Peak arc voltage vs. working voltage



1: L/R = 30 ms-3500-4000 V gRB
2: L/R = 15 ms 4000 V gRD

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics



Above: Curves indicate, for each rated current, the pre-arcing time vs. the R.M.S. pre-arcing current.

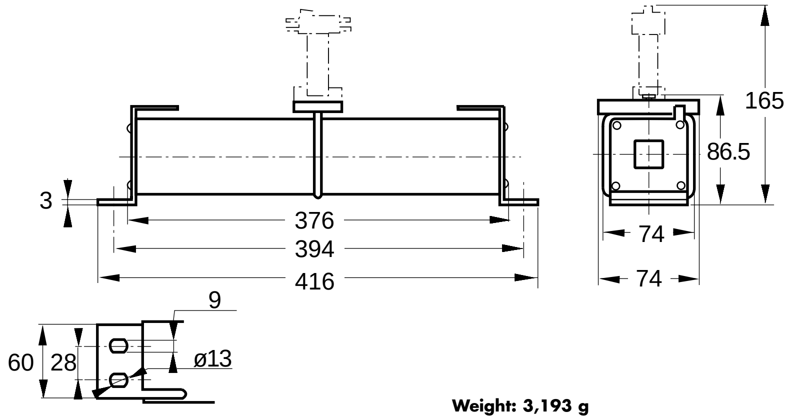
± 10% tolerance for mean pre-arcing current

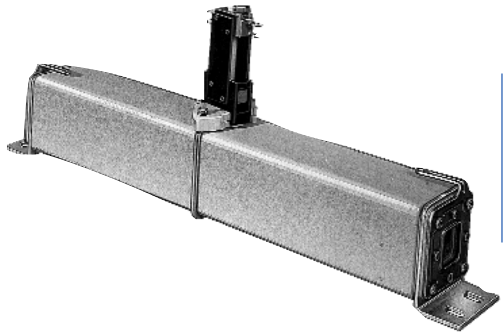
Square-body Fuses

4000V DC

4000 V DC
gRB-gRD from 100 to 280 A
Size 602

Dimensions





Weight: 3,193 g

MAIN CHARACTERISTICS

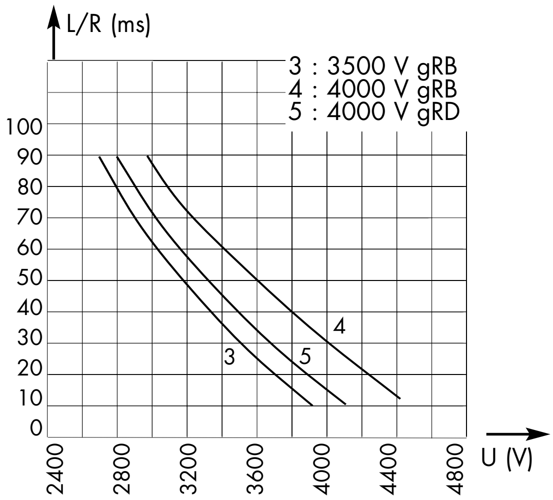
Size	Current rating I_N (A)	Interrupting rating	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number (1)	Ref. Number	Pack.
602	100 125 160	@ 4000 V DC 30 kA L/R = 30 ms	55.6 72.4 84.8	100.8 131.1 153.6	CC 40 gRB 602 QF 0100 CC 40 gRB 602 QF 0125 CC 40 gRB 602 QF 0160	V086958 W086959 X086960	1 piece
	160 200 250 280	@ 4000 V DC 30 kA L/R = 15 ms	58 76.5 95 108	101 141 174 198	CC 40 gRD 602 QF 0160 CC 40 gRD 602 QF 0200 CC 40 gRD 602 QF 0250 CC 40 gRD 602 QF 0280	E075766 F075767 G075768 H075769	

MC 2R 3E 1-5NBS microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 4000V DC

ELECTRICAL CHARACTERISTICS

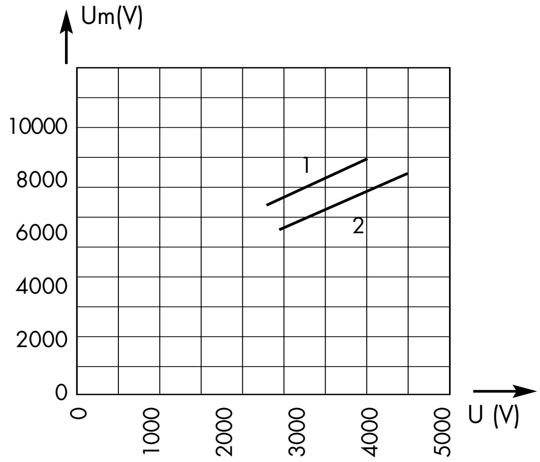
DC application data



Above: Curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3600 V with interrupting rating of 30 kA

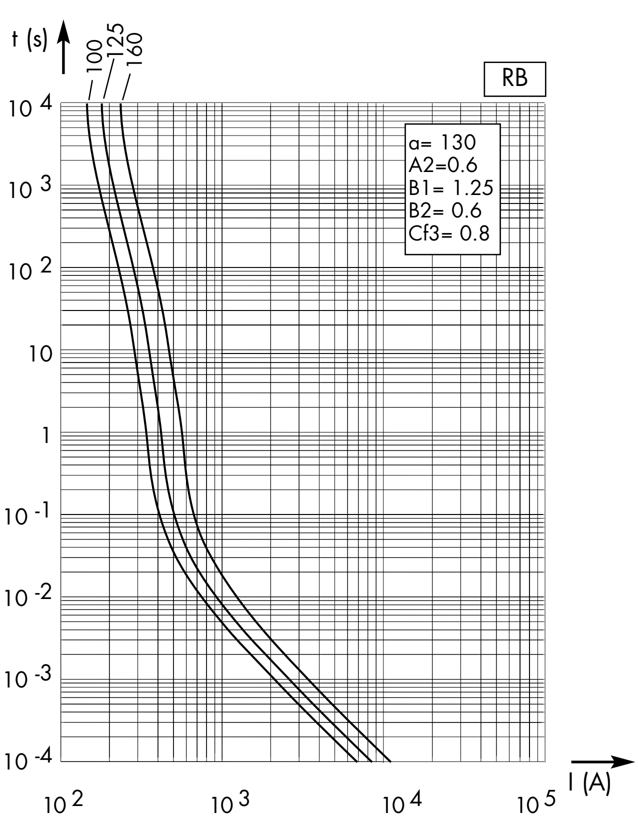
Peak arc voltage vs. working voltage

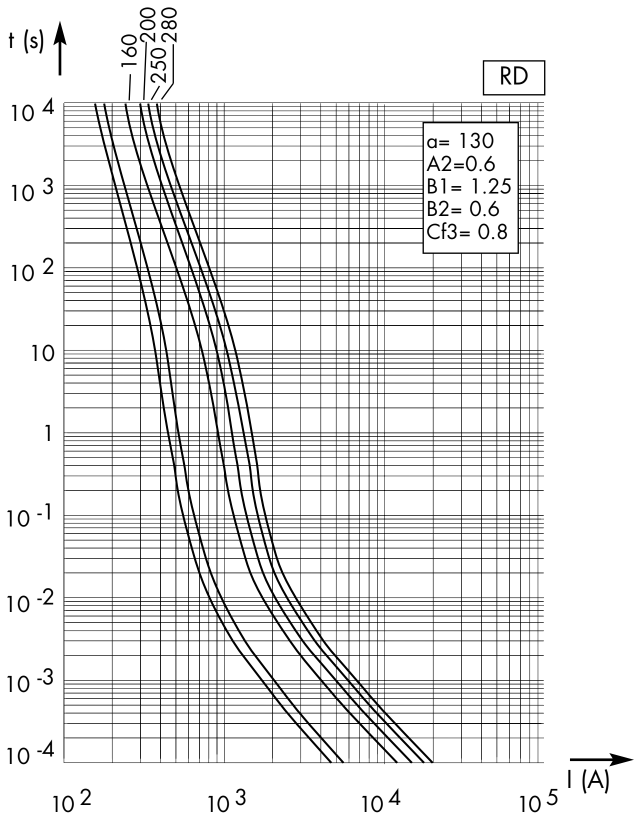


1 : L/R = 30 ms-3500-4000 V gRB
2 : L/R = 15 ms 4000 V gRD

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics





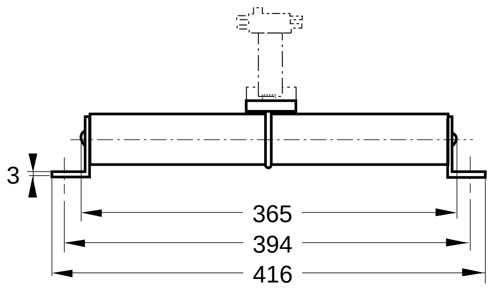
Above, left and right: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

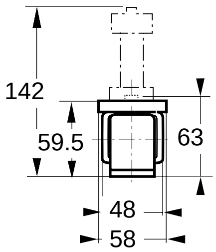
± 10% tolerance for mean pre-arcing current

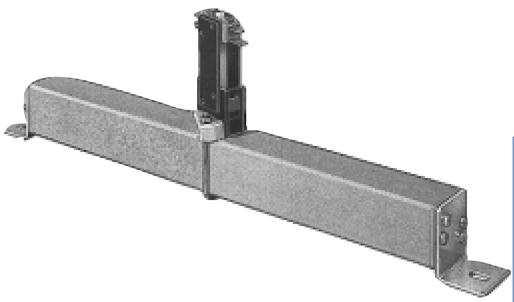
Square-body Fuses 3500-4000V DC

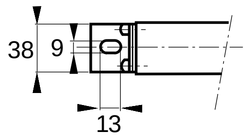
3500-4000 V DC
SRB from10 to 32 A
Size 600

Dimensions









Weight: 1.445 kg

MAIN CHARACTERISTICS

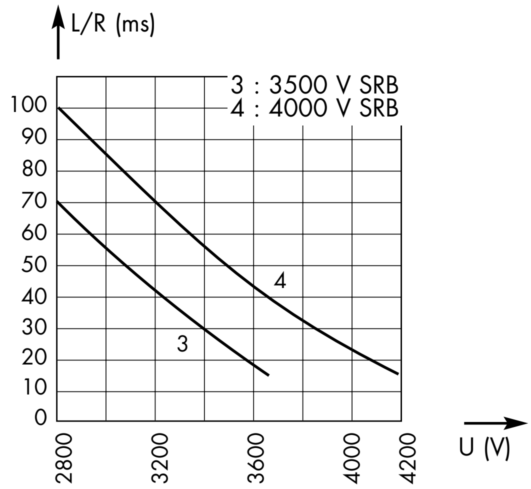
Size	Current rating I_N(A)	Interrupting rating	Watts losss 0.8 I_N	Watts losss I_N	Catalog Number (1)	Ref. number	Pack.
600	10	under 3500 V= 60 kA L/R = 25 ms	5.5	12	CC 35 SRB 600 QF 0010	E089405	1 piece
	16		8.2	18	CC 35 SRB 600 QF 0016	F089406	
	20	under 4000 V= 60 kA L/R = 25 ms	10.5	23	CC 40 SRB 600 QF 0020	G086946	
	25		13.3	29	CC 40 SRB 600 QF 0025	H086947	
	32		16.5	36	CC 40 SRB 600 QF 0032	J086948	

MC 2R 3E 1-5NBS Microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 3500-4000V DC

ELECTRICAL CHARACTERISTICS

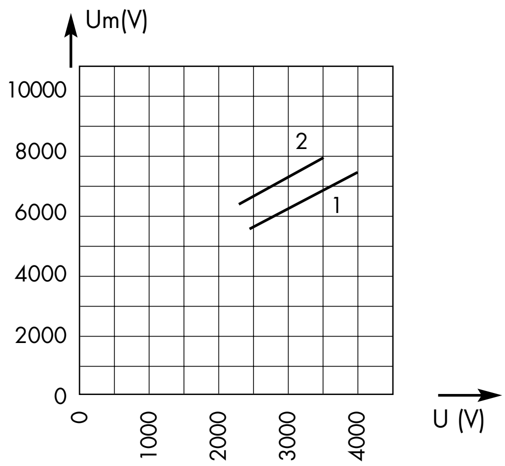
DC application data



Above: curves indicate maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
4500 V with interrupting rating of 100 kA

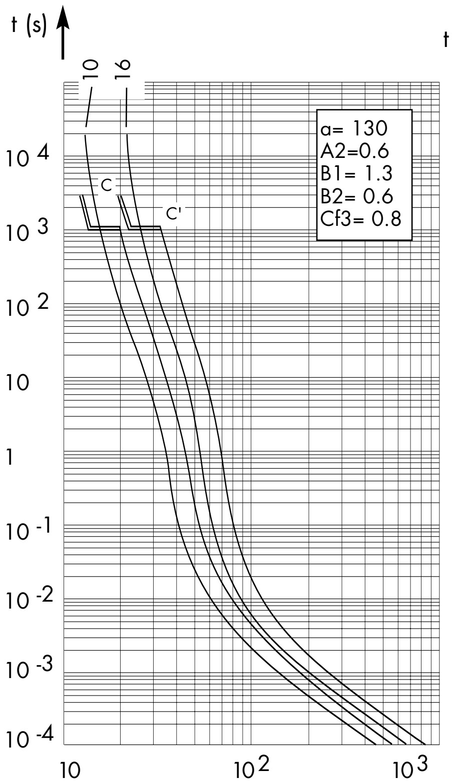
Peak arc voltage vs. working voltage

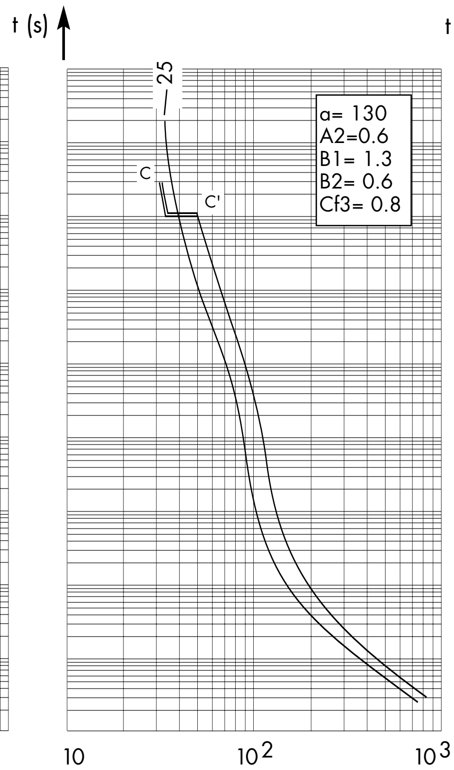


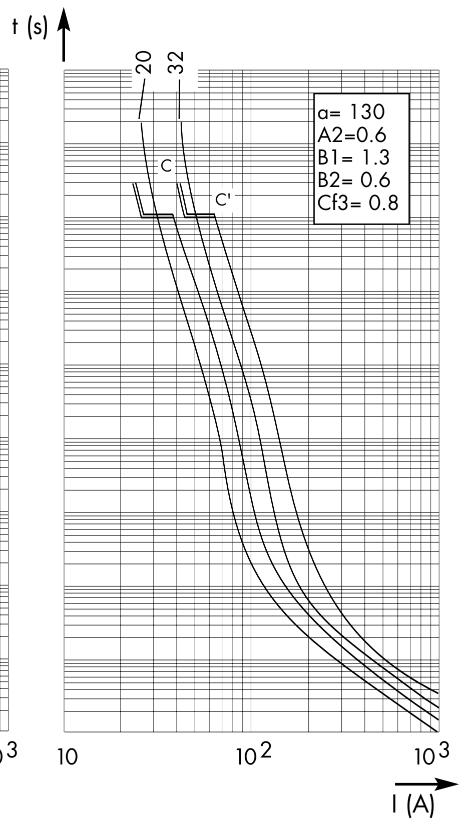
1: L/R = 25 ms-3500-4000 V SRB
2: L/R = 50 ms 3500-4000 V SRB

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics





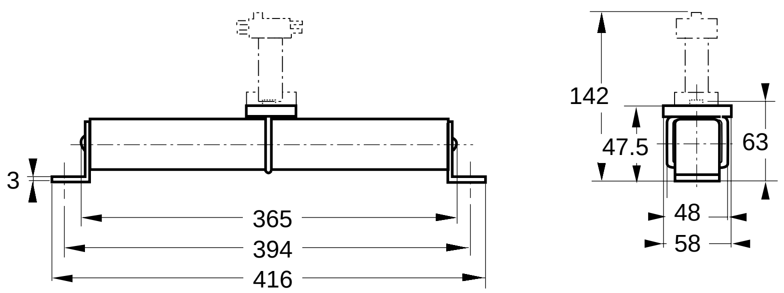


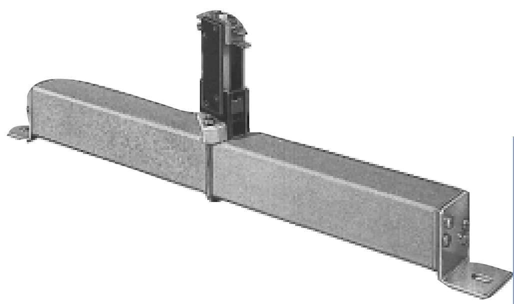
These curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current.

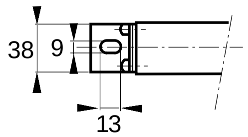
Square-body Fuses 4200V DC

4200 V DC
SRE from 40 to 150 A
Size 600

Dimensions







Weight: 1,445 g

MAIN CHARACTERISTICS

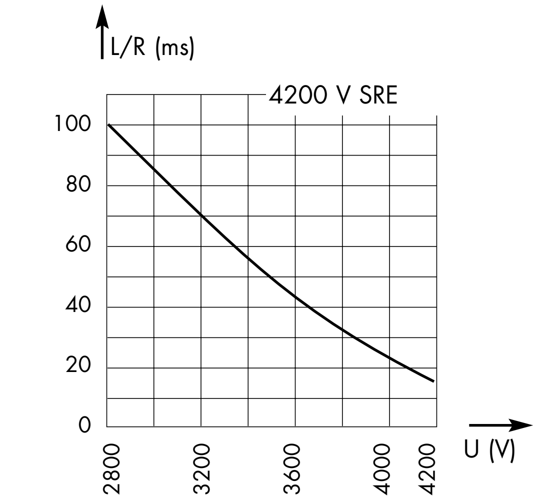
Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 3500 V =		Watts loss		Catalog Number (1)	Ref. Number	Pack.
			L/R=15ms	L/R=45ms	0.8 I_N	I_N			
600	40	@ 4000 V DC 60 k A L/R = 25 ms	480	350	50	100	CC 42 SRE 600 QF 0040	C079490	1 piece
	50	@ 4200 V DC 60 k A L/R = 15 ms	1050	800	52	103	CC 42 SRE 600 QF 0050	D079491	1 piece
	63		2100	3500	57	114	CC 42 SRE 600 QF 0063	E079492	
	80		3500	6000	65	128	CC 42 SRE 600 QF 0080	F079493	
	100		8000	13500	70	140	CC 42 SRE 600 QF 0100	G079494	
	125		16500	28000	75	147	CC 42 SRE 600 QF 0125	H079495	
	150		31000	55000	78	155	CC 42 SRE 600 QF 0150	V079667	

MC 2R 3E 2.5BS Microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 4200V DC

ELECTRICAL CHARACTERISTICS

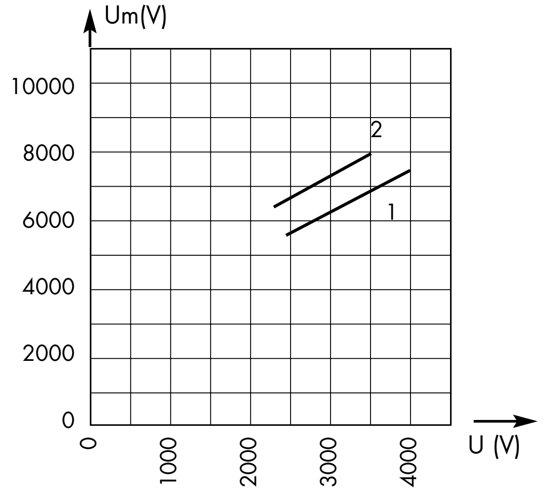
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3,800 V with interrupting rating of 50 kA

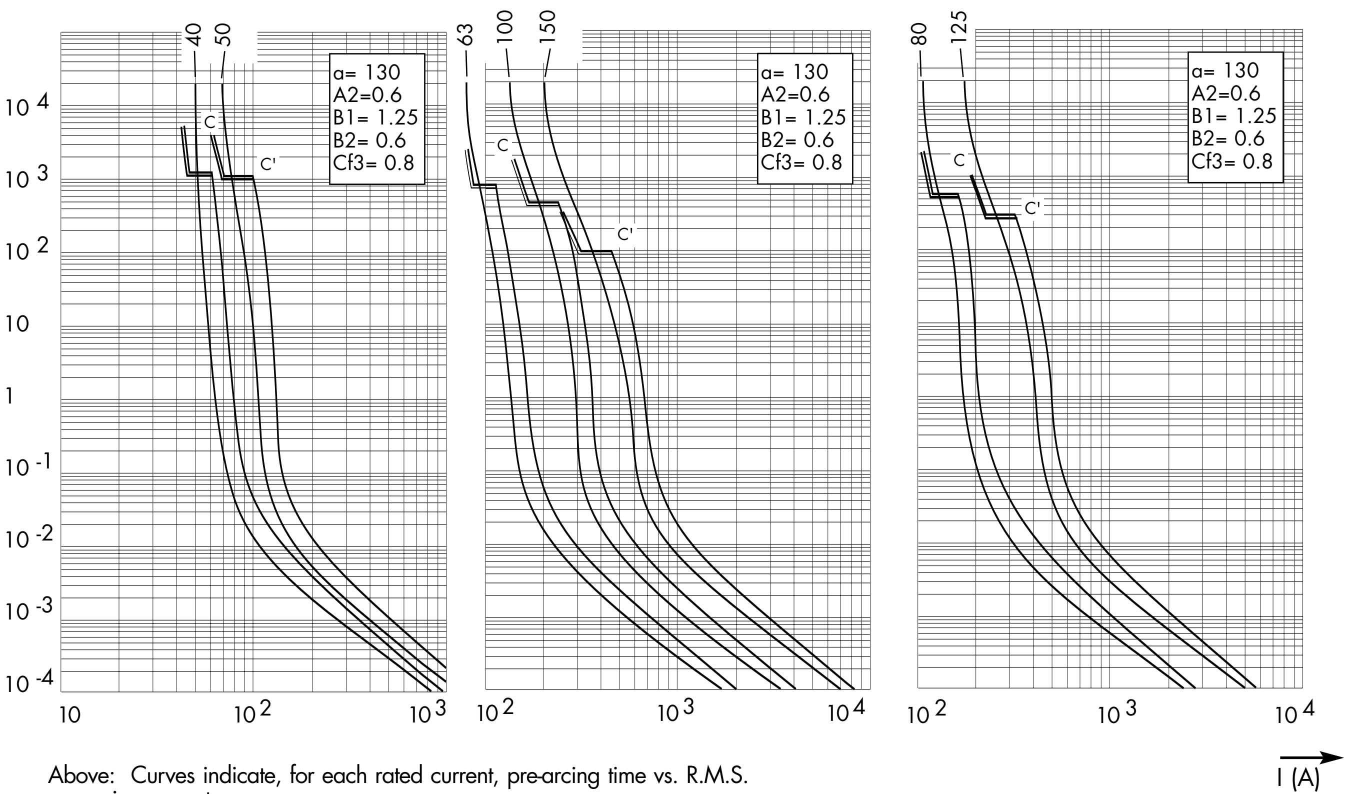
Peak arc voltage vs. working voltage



1 : L/R = 15 ms 4200 V SRE
2 : L/R = 45 ms 4200 V SRE

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics

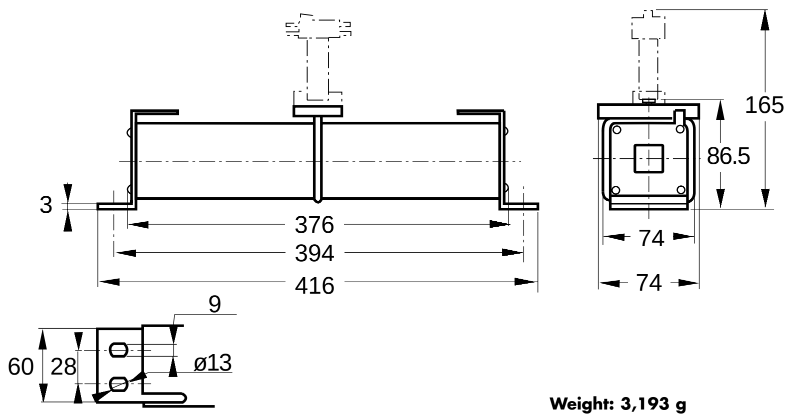


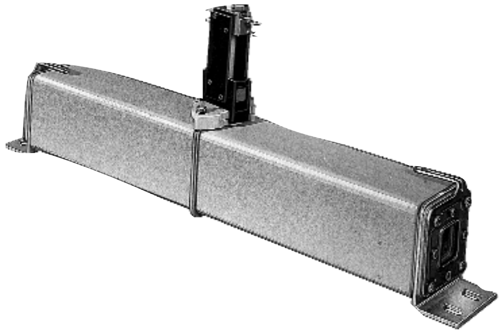
Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Square-body Fuses 4200V DC

4200 V DC
SRF-SRH from 200 to 375 A
Size 602

Dimensions





Weight: 3,193 g

MAIN CHARACTERISTICS

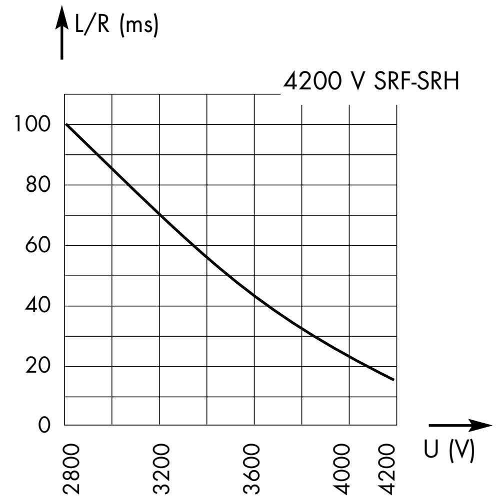
Size	Current rating I_N(A)	Interrupting rating	Maximum I2t @ 3500 V DC L/R=15ms	Maximum I2t @ 3500 V DC L/R=45ms	Watts loss 0.8 I_N	Watts loss I_N	Catalog Number (1)	Ref. Number	Pack.
602	200 250 315 375	@ 4200 V DC 60 kA L/R = 15 ms	45000 100000 220000 195000	80000 180000 375000 325000	119 122 128 147	228 232 245 280	CC 42 SRF 602 QF 0200 CC 42 SRF 602 QF 0250 CC 42 SRF 602 QF 0315 CC 42 SRH 602 QF 0375	J079496 K079497 L079498 H076643	1 piece

MC 2R 3E 1-5NBS Microswitch. Ref. Number: J310025 (see page 423)
(1) Catalog number to change in 2000

Square-body Fuses 4200V DC

ELECTRICAL CHARACTERISTICS

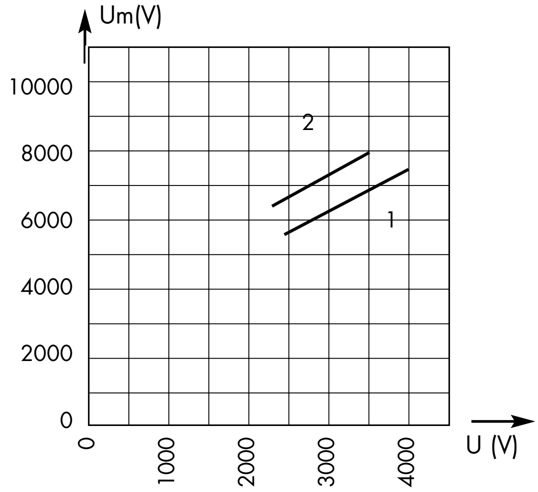
DC application data



Above: Curve indicates maximum permissible value of time constant L/R as a function of DC working voltage

Max. AC voltage (50/60 Hz):
3,800 V with interrupting rating of 50 kA

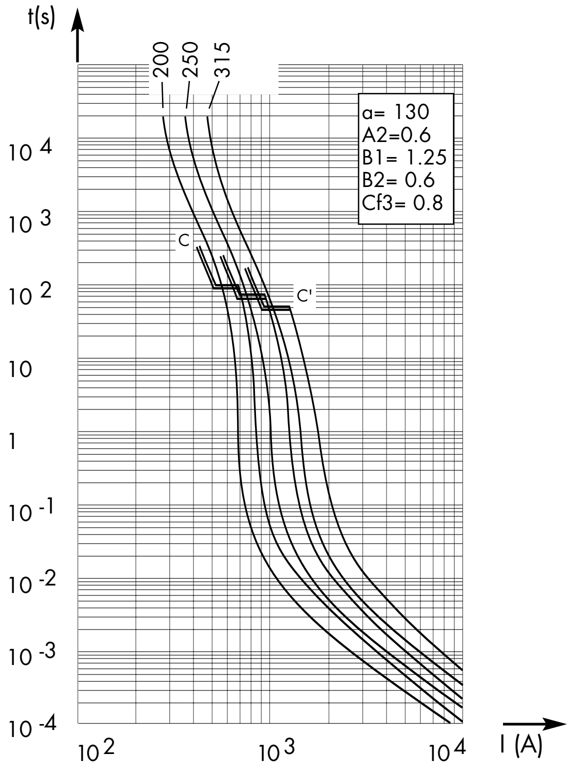
Peak arc voltage vs. working voltage

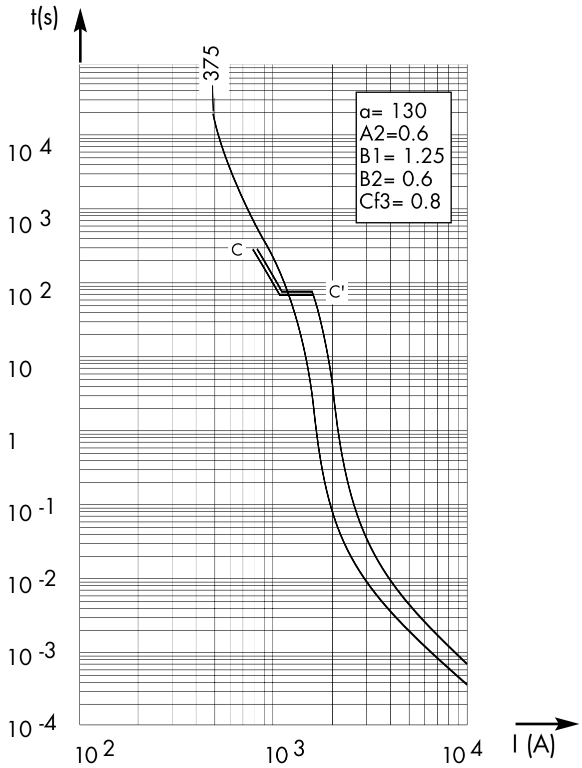


1 : L/R = 15 ms 4200 V SRF-SRH
2 : L/R = 45 ms 4200 V SRF-SRH

Above: Curves indicate for various time constants L/R the peak arc voltage which may appear across fuse terminals, vs. DC working voltage

Time vs. current characteristics





Above: Curves indicate, for each rated current, pre-arcing time vs. R.M.S. pre-arcing current

Semiconductor Fuses

Microswitches & Studs

Microswitch Systems

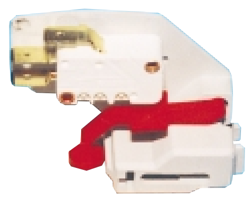
- MICROSWITCH SYSTEMS ADAPTED TO THE FOLLOWING FUSES:
  - PSC sizes 30, 31, 32, 33 / 70, 71, 72, 73
  - Blade-type PSC (PA) sizes 0-1, 2-3 / 70, 71, 72, 73
  - PSC sizes 000 / 00

New

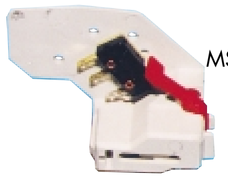
MS 4L 2-5 B6



MS PA 2-5

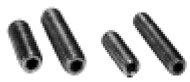


- HIGHLY RESISTANT STUDS OFFERING OPTIMIZED CONNECTION, EXCELLENT ELECTRICAL CONTACT AND HIGH MECHANICAL WITHSTAND FOR STUD-STYLE FUSES



MS 4L 2-5

Connection studs



MS 7V 1-5



MAIN CHARACTERISTICS

Code	AC Insulation voltage rating (***)	Positive operating voltage/current	Current rating	Interrupting rating							AC voltage withstand test (*)	Impulse voltage test Uimp1.2/50 µs (**)	Fire class according to UL 94
				Current	Non inductive circuit			Inductive circuit : L/R = 25ms					
					30V	110V	250V	30V	110V	250V			
MS 3V 1-5	1000 V	20 V	10 A	50/60 Hz	10 A	10 A	10 A	10 A	10 A	10 A	8,5 kV	14 kV	
MS 7V 1-5	1500 V	50 mA		DC	8 A	0,4 A	0,2 A	4 A	0,2 A	0,1 A	12 kV	20 kV	
MS 3V 1-5 BS	1000 V				3 A	3 A	3 A	2 A	1 A	1 A	8,5 kV	14 kV	H.B
MS 3V 1-9 BS		10 V	3 A	50/60 Hz									
MS 7V 1-5 BS	1500 V	10 mA		DC	3 A	0,5 A	0,25 A	3 A	0,2 A	0,1 A	12 kV	20 kV	
MS 7V 1-9 BS													
MS 3V 1-5 ET	1000 V	10 V	3 A	50/60 Hz	3 A	3 A	3 A	2 A	1 A	1 A	8.5 kV	14 kV	H.B.
MS 7V 1-5 ET	1500 V	10 mA		DC	3 A	0.5 A	-	2 A	0.2 A	-	12 kV	20 kV	
MS PA 2-5	1500 V	20 V	10 A	50/60 Hz	10 A	10 A	10 A	10 A	10 A	10 A	9 kV	13 kV	V0
MS PA 2-9		50 mA		DC	8 A	0,4 A	0,2 A	4 A	0,2 A	0,1 A			
MS PA 2-5 B2	1500 V	20 V		50 Hz	4 A	4 A	5 A		5 A	5 A	12 kV	16 kV	V0
MS 4L 2-5 B2	1000 V	100 mA	5 A	DC					2 A	0,4 A	8 kV	13 kV	
+ Pres													
MS 4L 2-5 B6	1000 V	20 V	10 A	50/60 Hz	10 A	10 A	10 A	10 A	10 A	10 A	8 kV	10 kV	V0
+ Pres		50 mA		DC	8 A	0,4 A	0,2 A	4 A	0,2 A	0,1 A			
MC 6,3 GR 2-5 N	1000 V	20 V	5 A	50/60 Hz		5 A	3 A		3 A	2 A	3.5 kV		
		100 mA		DC	4 A	0.4 A		3 A	0.4 A				H.B.
MC 36 GR 2-5	1000 V	20 V	5 A	50/60 Hz		5 A	5 A		5 A	5 A	7.5 kV		
		100 mA		DC	4 A	0.4 A		2 A	0.4 A				

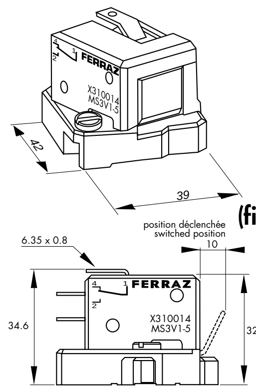
* Between power circuit and microswitch terminals as per IEC 60 and 694 and NFC 64010 (50/60 Hz 1 min duration in dry air)
** Between power circuit and microswitch terminals Uimp: impulse voltage as per IEC 947-1
*** Between power circuit and microswitch terminals
EACH MICROSWITCH WEIGHS LESS THAN 100 g, THEREFORE NO FUME AND SMOKE GRADE IS REQUIRED BY NF F 16-102 STANDARD

Microswitches systems for PSC

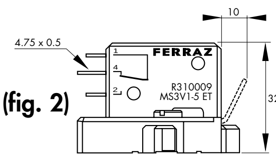
INDICATION SYSTEMS FOR PSC FUSE SIZES 30 TO 73

MS 3V...

These patented indication systems are exclusively hand resettable.



(fig. 1)

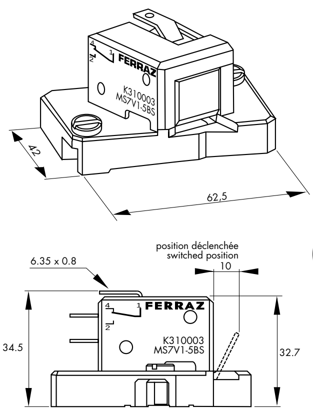


(fig. 2)

Fuse size	Code	Ref. Number	Indication style	Weight (g)	Packaging
Sizes 30, 31 32, 33	MS 3V 1-5 (fig.1)	X310014	Standard NO-NC	34	3 pieces
	MS 3V 1-5 BS (3)	W310013	Low level NO-NC	34	3 pieces
	MS 3V 1-9 BS (4)	T310011	Low level NO-NC	44	3 pieces
	MS 3V 1-5 ET (fig.2)	R310009	Low level NO-NC IP 50 (9)	34	3 pieces

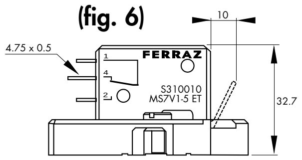
(3) Same as fig.1
(4) Same dimensions as figure 1 but with 2 microswitches side by side
(9) Watertightness class

MS 7V1...



(fig. 5)

(fig. 6)

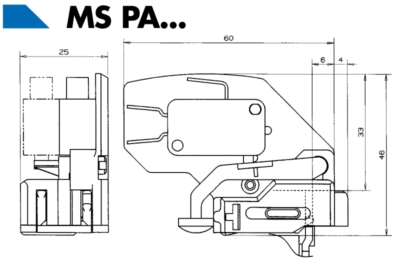


Fuse size	Code	Ref. Number	Indication style	Weight (g)	Packaging
Sizes 70, 71 72, 73	MS 7V 1-5 (fig.5)	J310002	Standard NO-NC	45	3 pieces
	MS 7V 1-5 BS (7)	K310003	Low level NO-NC	45	3 pieces
	MS 7V 1-9 BS (8)	P310007	Double pole NO-NC low level	55	3 pieces
	MS 7V 1-5 ET (fig.6)	S310010	Low level NO-NC IP 50 (9)	55	3 pieces

(7) Same as fig. 5
(8) Same dimensions as figure 5 but with 2 microswitches side by side
(9) Watertightness class

Attention: Microswitch systems exclusively designed for FERRAZ SHAWMUT PSC fuses fitted with a patented trip-indicator, saving use of EDV.

MS PA...



New

Exclusive "MS PA" indication systems are automatically resettable

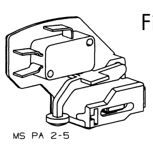


Fig.7

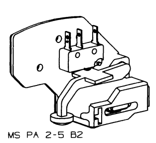


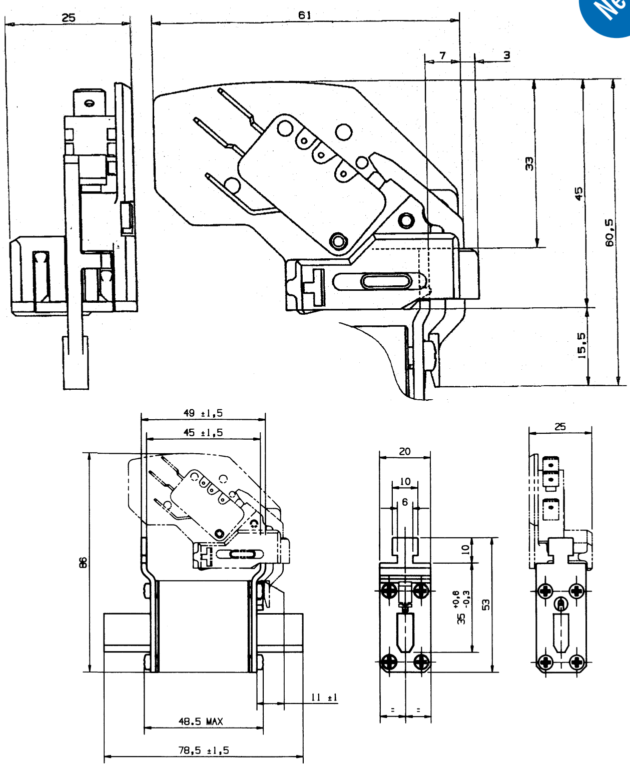
Fig.8

Fuse sizes	Catalog Number	Reference Number	Indication Style	Weight	Pack.
0-1-2-3 71-72-73	MS PA 2-5	H210158	OF Standard (fig. 7)	32,5	1
	MS PA 2-9V	J210159	Double (fig.7) OF side by side	39,5	1
	MS PA 2-5 B2	C210360	OF Terminals 2,8 (fig. 8)	27	1
70	MS PA 2-5	T210398	OF Standard (fig.7)	31	1
	MS PA 2-9	V210399	Double (fig.7) OF side by side	37	1
	MS PA 2-5 B2	W210400	OF Terminals 2,8 (fig.8)	27	1

Microswitch Systems

MICROSWITCH INDICATION SYSTEM FOR 000 & 00 FUSES AS PER DIN 43653 AND DIN 43620 TERMINALS

New



Catalog Number	Ref. Number	Weight (g)	Packaging
MS 4L 2-5 B6 + PRES (Fig. 1) [1]	F210156C	30	3
MS 4L 2-5 B2 + PRES (Fig. 2) [2]	G210157C	26	3

Automatically resettable, these microswitch systems indicate fuse presence (PRES) and proper mounting.
In case of improper mounting or fuse melting, this is indicated (terminal 1-4 closed)

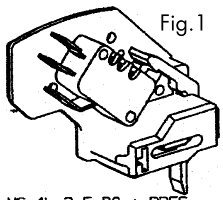


Fig.1
MS 4L 2-5 B6 + PRES

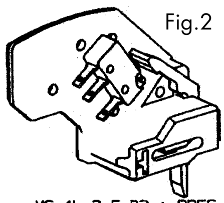
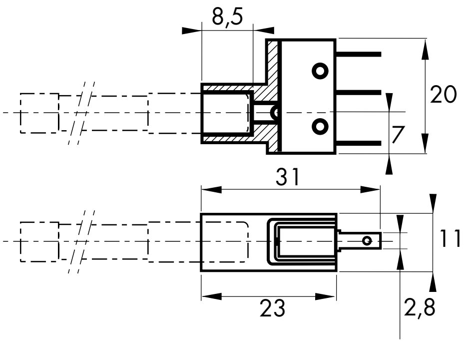


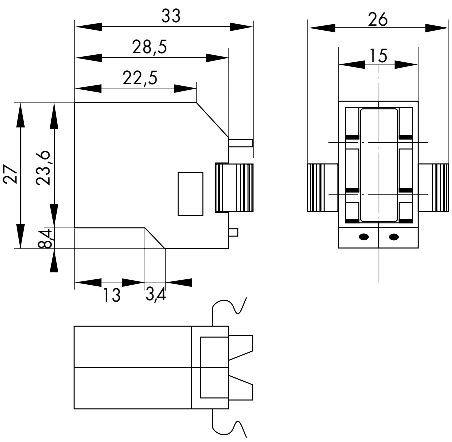
Fig.2
MS 4L 2-5 B2 + PRES

[1] 6.3 mm clips
[2] 2.8 mm clips

MC indication system for BS 88-4 separate blown fuse trip-indicator



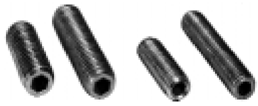
Catalog Number	Ref. Number	Weight (g)	Packaging
MC 6,3 GR 2-5 N with separate trip-indicator	Y 310015	10	3 pieces



Catalog Number	Ref. Number	Weight (g)	Packaging
MC 36 GR 2-5 for British standard with built-in trip-indicator Ø 27 and 36	P 092496	10	3 pieces

Studs for threaded terminal fuses

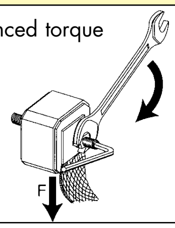
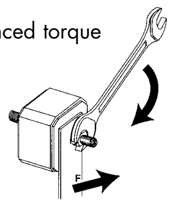
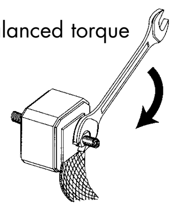
METRIC STUDS FOR THREADED TERMINAL FUSES



Type and fuse size	Catalog Number	Ref. Number	Unit weight (g)	Packaging
 Sizes 0 and 1	HC stud pair M8x30 & M8x35	S098801	23	6 pairs
Size 2	HC stud pair M10x30 & M10x50	T098802	40	6 pairs
Size 3	HC stud pair M12x35 & M12x50	V098803	60	6 pairs
 Size 2	HC stud pair M10x50	W098804	45	6 pairs
Size 3	HC stud pair M12x50	X098805	45	6 pairs

We recommend the use of studs, whose quality is suited to all FERRAZ SHAWMUT square-body fuses with terminals

STUD MOUNTING

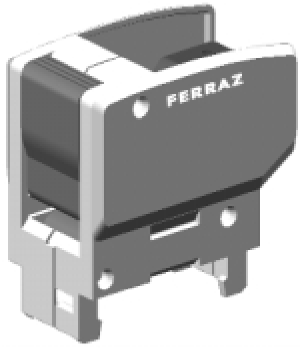
Torque type	Stud type	Maximum stud tightning torque (Nm) (1)	Maximum nut tightning torque (Nm) (1)
Balanced torque 	M8x30 & M8x35 M10x30 & M10x50 M12x35 & M12x50	13.5 15 15	13.5 26 46
Balanced torque 	M8x30 & M8x35 M10x30 & M10x50 M12x35 & M12x50	13.5 15 15	13.5 26 46
Unbalanced torque 	M8x30 & M8x35 M10x30 & M10x50 M12x35 & M12x50	13.5 15 15	13.5 26 15

(1) Factory limit on torque at 20°C ambient: +0, -2Nm; except on 46Nm value (+0, -4Nm)

Microswitch Systems — Protistor® Fuses

MICROSWITCH SYSTEMS
FOR ROUND AND SQUARE-BODY FUSES
(EXCEPT PSC LINE)

- REMOTE SIGNALING SYSTEMS FOR FITTING ON FERRAZ SHAWMUT FUSES EQUIPPED WITH MICROSWITCH SUPPORT (all square-body and round fuses except PSC)
- PERMANENT INDICATION OF FUSE STATE
  - CONDUCTIVE
  - BLOWN
- HAND RESETTING FOR CHECKING AND AFTER BLOW
- STANDARD MODEL AND LOW ELECTRICAL LEVEL WITH DIFFERENT INSULATION LEVELS
- VAPOR AND WATERTIGHT MODEL FOR USE IN CORROSIVE ATMOSPHERE



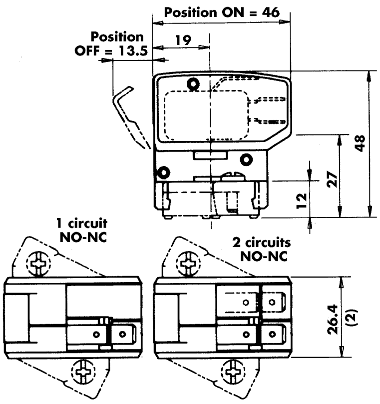
MAIN CHARACTERISTICS

Type	Catalog Number	AC or DC Insulation voltage rating Ui (V)	AC voltage withstand test (*)	Impulse voltage test Uimp1,2/50 µs (**)	Positive operating min.voltage /min.current	Current rating	Interrupting rating						
							Current	Non-inductive circuit			Inductive circuit: L/R = 25ms		
								30V	110V	250V	30V	110V	250V
Standard	MC3E 1-5N	1250V	15 kV	20 kV	20 V 50 mA	5 A	50/60 Hz	10 A	10 A	7 A			6 A
	MCR3E 1-5N	2200	20 kV	30 kV			DC	5 A	0.5 A		1.6 A	0.3 A	
Low level	MC3E 1-5NBS MC3E 1-9NBS	1250 V	15 kV	20 kV	10 V 10 mA	3 A	50/60 Hz	3 A	3 A	3 A	2 A	1 A	1 A
	MCR3E 1-5NBS MCR3E 1-9NBS	2200 V	20 kV (1) 23 kV (2)	30 kV			DC	3 A	0.5 A	0.25 A	3 A	0.2 A	0.1 A
	MC2R3E 1-5NBS MC2R3E 1-9NBS	6000 V	24 kV (1) 26 kV (2) 32 kV (3)	40 kV									
Watertight IP 50	MC3E 1-5NET MCR3E 1-5NET MC2R3E 1-5NET	1250 V 2200 V 6000 V	11 kV 20 kV (1) 24 kV (2)	16 kV 30 kV 40 kV	10 V 10 mA	3 A	50 Hz		3 A	3 A		1 A	1 A
							DC		0.5 A			0.2 A	

Catalog Numbering system: MC3E 1-5 single pole microswitch - MC3E 1-9 double pole microswitch - MCR, MC2R reinforced insulation microswitch.
* Between power circuit and microswitch terminals as per IEC 60 and 694 and NFC 64010 (50/60 Hz 1 min duration in dry air).
** Between power circuit and microswitch terminals Uimp: impulse voltage according to IEC 947-1.
*** Between power circuit and microswitch terminals
Each microswitch weighs less than 100g, therefore no fume and smoke grade is required by NF F16102 standard
(1) fitting short body fuses (sizes 30 - 31 - 32 - 33 - 70 - 71 - 72 - 73 - 83 - 84).
(2) fitting sizes 100 - 91 - 92 - 93 - 94 fuses and longer.
(3) fitting sizes 171 - 172 - 173 - 174 fuses and longer

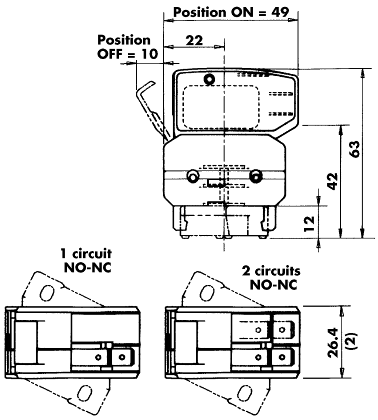
Microswitch Systems — Protistor® Fuses

REMOTE SIGNALING WITH 1250 V AC/DC INSULATION VOLTAGE



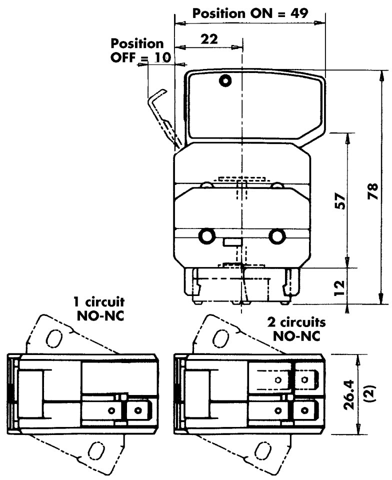
Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack. (1)
1	standard	MC3E 1-5N	D310020	39.5	3
1	low level	MC3E 1-5NBS	E310021	39.5	3
2	low level	MC3E 1-9NBS	F310022	45.7	3
1	watertight	MC3E 1-5NET	L310027	40.2	3

REMOTE SIGNALING WITH INSULATION VOLTAGE UP TO 2200 V AC/DC



Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack.
1	standard	MCR3E 1-5N	G310023	51.7	1
1	low level	MCR3E 1-5NBS	P310030	51.7	1
2	low level	MCR3E 1-9NBS	H310024	58.0	1
1	watertight	MCR3E 1-5NET	Q310031	52.5	1

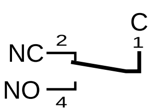
REMOTE SIGNALLING WITH INSULATION VOLTAGE UP TO 6000 V AC/DC



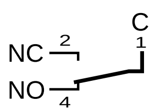
Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack.
1	low level	MC2R3E 1-5NBS	J310025	64.0	1
1	watertight	MC2R3E 1-5NET	N310029	64.8	1
2	low level	MC2R3E 1-9NBS	K310026	70.3	1

NOTE (2): The 26.4 dimension is the same with 1 or 2 separated circuits NO-NC.

Electrical diagram of each microswitch circuit



Non-blown fluse
Microswitch ON



Blown fluse
Microswitch OFF

All of these signalling systems are hand resettable and fitted with silver-plated 3-terminal microswitch C, NO and NC.
The C terminal is on the top and connection is made via 6.35 mm clips except for watertight models whose clips are 4.8 mm wide.

Tests with sine vibrations carried out at ambient with scanning of the three main holder axes.

Spectrum: 1st segment (2 to 16 Hz) constant trip x = 5 mm peak.
2nd segment (16 to 250 Hz) constant acceleration $\gamma = 5$ g peak.
Exponential scanning speed : 1 octave per minute.
Duration: 2 hours per axis.

Medium Voltage Fuses

North American Fuses

E-Rated





R-Rated







European Fuses









E-Rated

CS-3



5KV AND 15kV FERRULE MOUNTED FUSES

Amp-trap CS-3 E-rated 5kV and 15kV fuses have either 2" or 3" diameter barrels with ferrules and are mounted in spring reinforced clips. They are UL listed as "general purpose current-limiting fuses" and are for use indoors (or outdoors in a weatherproof enclosure). The unique time-current characteristic of Ferraz Shawmut E-rated fuses allows them to be closely sized to transformer full-load rated current, as recommended by IEEE guidelines, without being affected by normal magnetizing inrush current. CS-3 fuses are typically sized at transformer rated current of 133%, thereby providing superior overall protection.

Features / Benefits

- ✔ **UL Listed** for compatibility with UL listed equipment
- ✔ **Ferrule mounting** for standard clips and interchangeability with other brands of fuses
- ✔ **Current Limiting** for superior equipment protection
- ✔ **Blown-fuse indicator** gives positive identification of open fuse
- ✔ **Non-venting** for silent operation

HIGHLIGHTS:

- ✔ E-Rated
- ✔ UL Listed
- ✔ Complies with ANSI C37.46

APPLICATIONS:

- ✔ Protection for 5.5 or 15.5kV transformers or distribution systems

Ratings

- ✔ **A055F**
  AC: 5E to 450E
  5.5kV, 63kA I.R. Sym.
- ✔ **A155F**
  AC: 5E TO 200E
  15.5kV, 50kA I.R. Sym.

Approvals

- ✔ UL Listed to JEEG, "Fuses Over 600 Volts"

UL

DEFINITIONS:

E-rating
E-rated fuses operate as follows:
100E or less - must melt in 300 seconds (5 mins.) on 200 to 240% of E (ampere) rating.
Over 100E - must melt in 600 seconds (10 mins.) on 220 to 264% of E (ampere) rating.
Example - A 100E fuse must melt in 300 seconds with an applied current of 200 to 240 amperes.

General Purpose Current-Limiting Fuse
A general purpose current-limiting power fuse is one that is capable of interrupting all currents from its rated interrupting rating down to the current that causes melting of the fusible element in one hour.

Spring-Reinforced Clips for CS-3 Fuses:
228-700-530 (One pair of clips)

Medium Voltage Fuses

North American Power Fuses

E-Rated — CS-3

5.5kV Ferrule Mounted

Catalog Numbering System

A 055 F 1 D 0 R0 - 100 E

- A — Amp-trap Fuse
- 055 — Max. Voltage Rating (055=5.5kV)
- F — Style (F=Ferrule Mount)
- 1 — No. of Barrels
- D — Diameter (C=2", D=3")
- 0 — Special Features
- R0 — Revision/No.
- 100 E — Ampere Rating

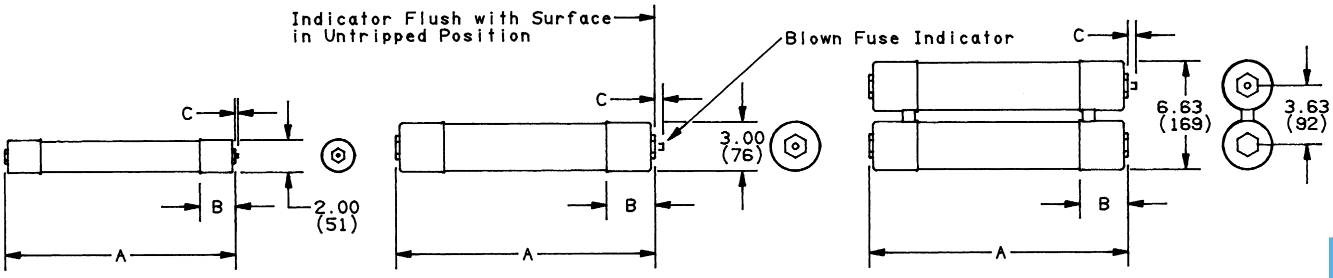


Figure A — Figure B — Figure C

Reference Numbers, Ratings, Dimensions, CS-3 Series, 5.5kV

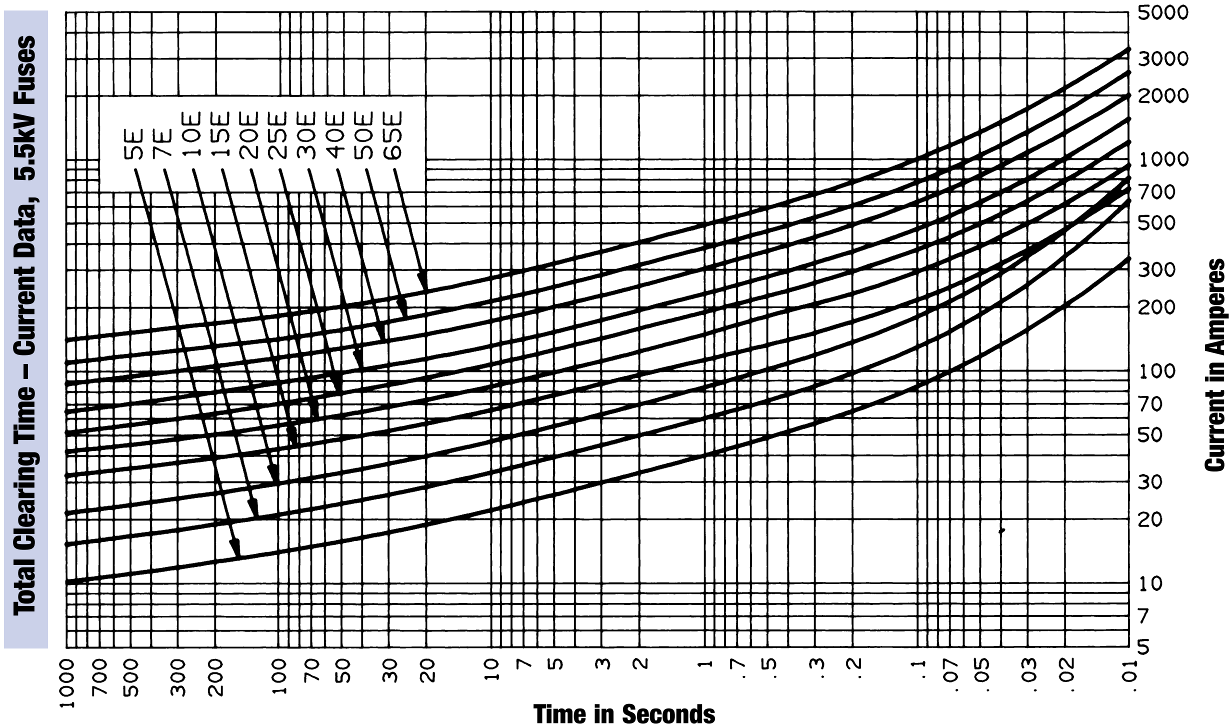
CATALOG NUMBER	REFERENCE NUMBER	AMPERE RATING	NUMBER OF BARRELS	FIG.	DIMENSIONS Inches (mm) A	B	C	INTERRUPTING RATING RMS SYM.* AMPERES
5.5kV Max. – Ferrule Mounted Style – 12" (305mm) Clip Centers – 2" (50.8mm) Barrel Diameter								
A055F1C0R0-5E	S213364	5E	1	A	14.11 (358)	2.2 (56)	.19 (4.8) Tripped Force 1 lb.	63,000
A055F1C0R0-7E	T214377	7E						
A055F1C0R0-10E	A222709	10E						
A055F1C0R0-15E	P223228	15E						
A055F1C0R0-20E	E201047	20E						
A055F1C0R0-25E	N201561	25E						
A055F1C0R0-30E	H203557	30E						
A055F1C0R0-40E	V212331	40E						
A055F1C0R0-50E	J212850	50E						
A055F1C0R0-65E	J213862	65E						
5.5kV Max. – Ferrule Mounted Style – 12" (305mm) Clip Centers – 3" (76.2mm) Barrel Diameter								
A055F1D0R0-10E	T214833	10E	1	B	15.88 (403)	3.0 (76)	0.5 (13) Tripped Force 2 lbs.	63,000
A055F1D0R0-15E	M218465	15E						
A055F1D0R0-20E	T221967	20E						
A055F1D0R0-25E	C222711	25E						
A055F1D0R0-30E	Q223229	30E						
A055F1D0R0-40E	G201049	40E						
A055F1D0R0-50E	Q201563	50E						
A055F1D0R0-65E	V203591	65E						
A055F1D0R0-80E	A211301	80E						
A055F1D0R0-100E	V211437	100E						
A055F1D0R0-125E	Y217440	125E						
A055F1D0R0-150E	G217954	150E						
A055F1D0R0-175E	F218988	175E						
A055F1D0R0-200E	Y219510	200E						
A055F2D0R0-250E	G218989	250E	2	C				
A055F2D0R0-300E	Z219511	300E						
A055F2D0R0-350E	V221968	350E						
A055F2D0R0-400E	D222712	400E						
A055F2D0R0-450E	R223230	450E						

* RMS ASYM. AMPERES = RMS SYM. AMPERES x 1.6

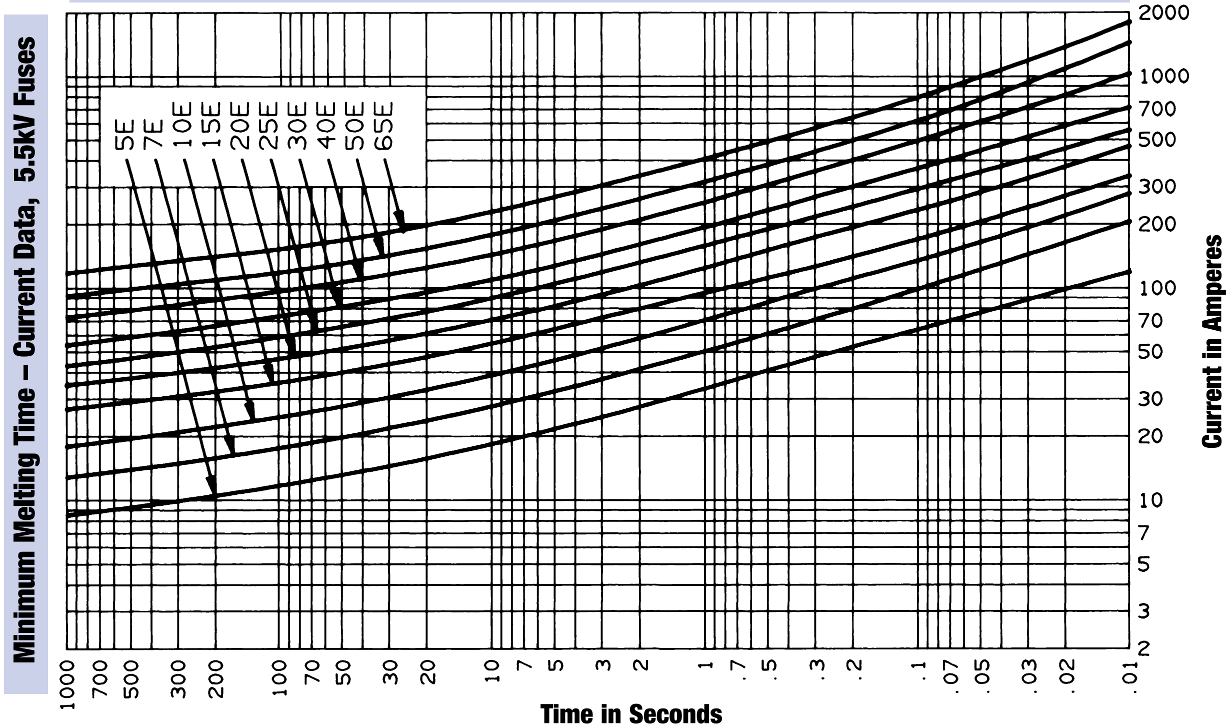
E-Rated

CS-3

A055F1CORO – 5E to 65E



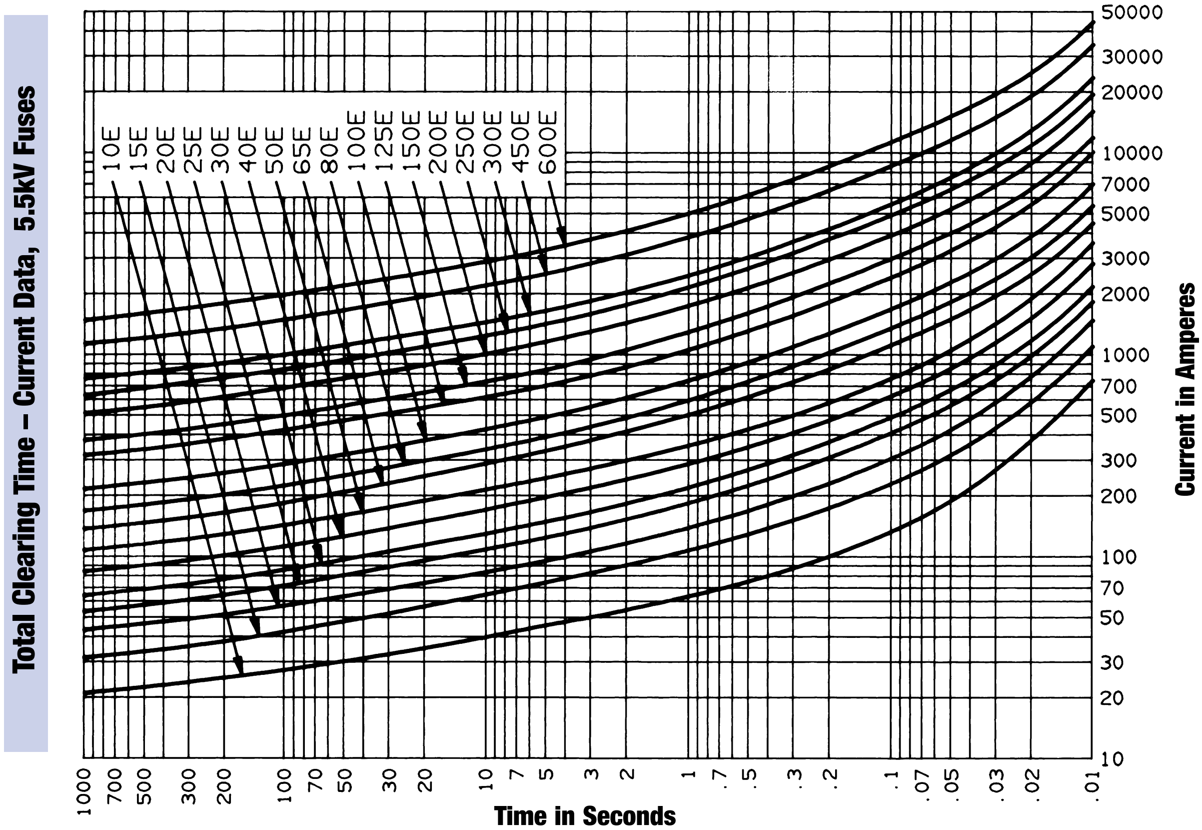
A055F1CORO – 5E to 65E



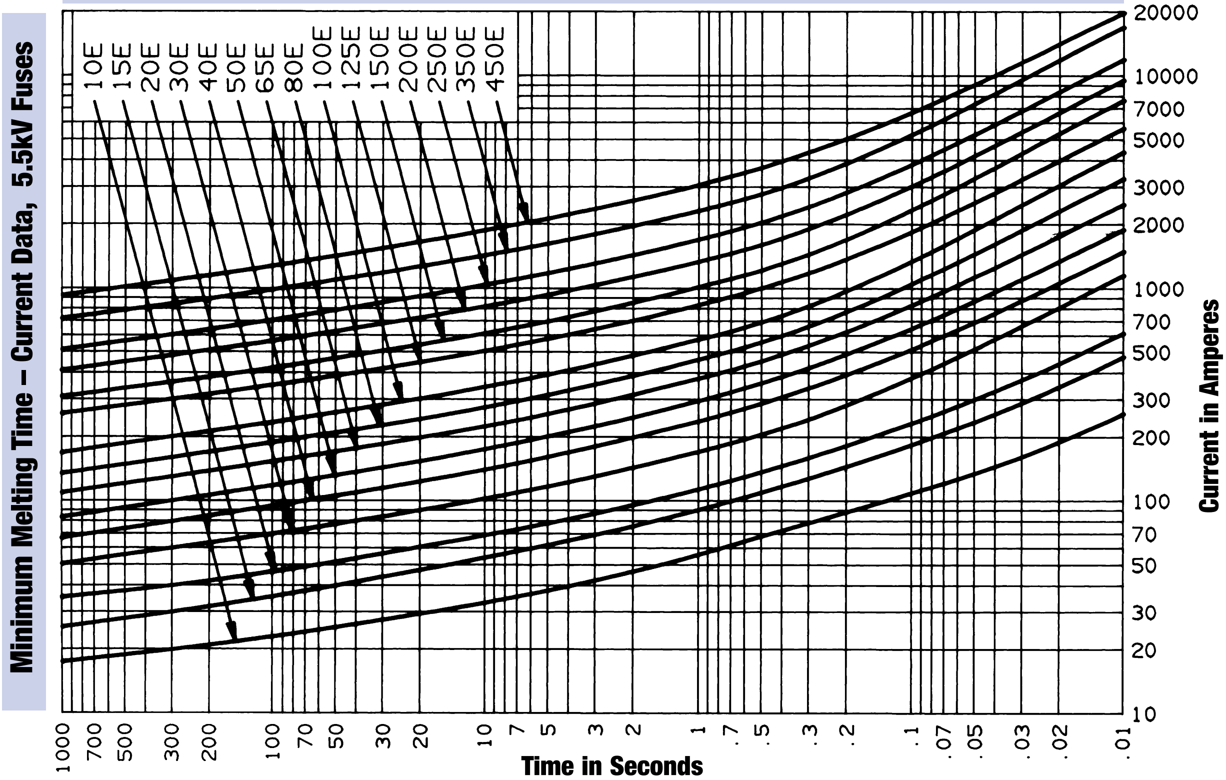
E-Rated

CS-3

A055F1D0R0 – 10E to 200E and A055F2D0R0 – 250E to 450E



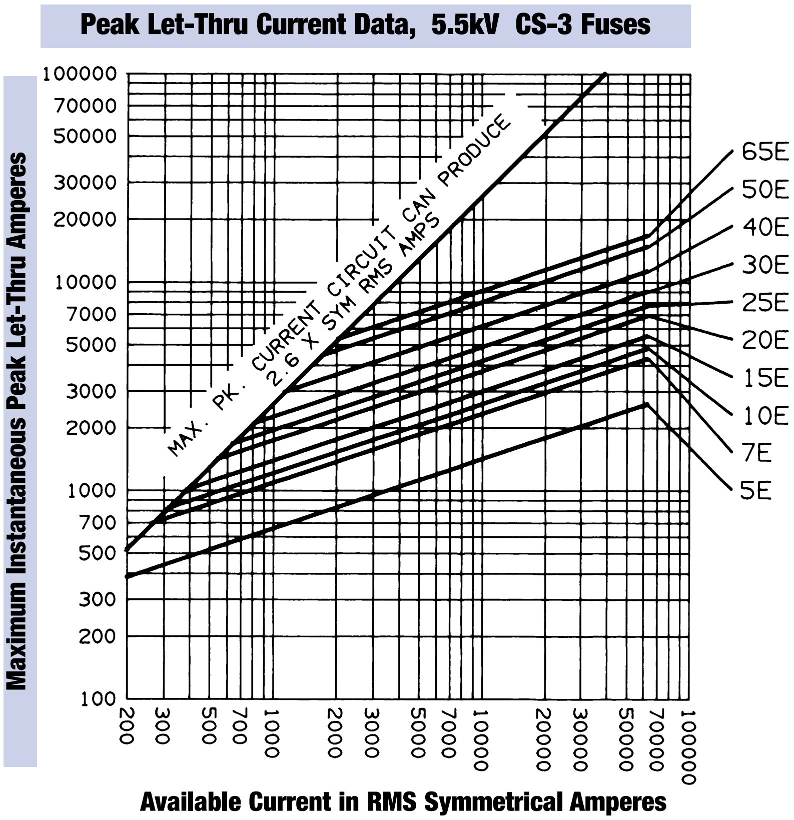
A055F1D0R0 – 10E to 200E and A055F2D0R0 – 250E to 450E



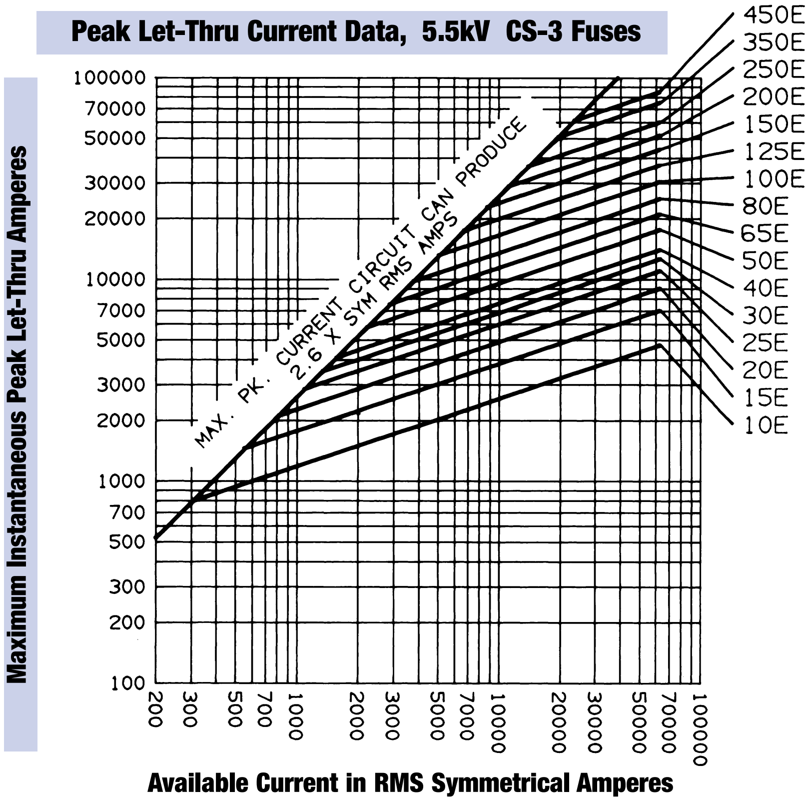
E-Rated

CS-3

A055F1C0R0 – 5E to 65E



A055F1D0R0 – 10E to 200E and A055F2D0R0 – 250E to 450E



Medium Voltage Fuses

North American Power Fuses

E-Rated A240T, A480T, A500T, A720T



POTENTIAL TRANSFORMER FUSES

Ferraz Shawmut E-rated PT fuses are current limiting fuses with high interrupting rating, used for primary protection of potential transformers. They are small dimension, ferrule-type fuses and mounted in standard clips. Ratings are 1/2E to 5E at 2.4, 4.8, 5.0 and 7.2kV.

Features/Benefits

- ✔ **Current limiting** protection for transformers
- ✔ **Ferrule mounting** for ease of installation in standard clips
- ✔ **Compact size** saves valuable mounting space
- ✔ **Fiberglass body** provides dimensional stability in harsh industrial environments
- ✔ **Metal embossed catalog number** for lasting identification

HIGHLIGHTS:

- ✔ E-Rated
- ✔ Current-Limiting

APPLICATIONS:

- ✔ Primary protection for 2.4, 4.8, 5.0 or 7.2kV potential transformers

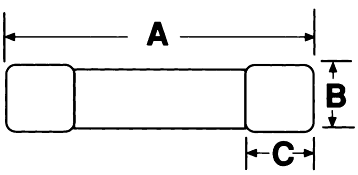
Ratings

✔ **A240T**
AC: 1/2E to 5E
2400VAC, 50kA I.R. Sym.

✔ **A500T**
AC: 1/2E to 5E
5000VAC, 50kA I.R. Sym.

✔ **A480T**
AC: 1/2E to 5E
4800VAC, 50kA I.R. Sym.

✔ **A720T**
AC: 1E to 2E
7200VAC, 50kA I.R. Sym.



Dimensions

CATALOG NO. PREFIX	DIMENSIONS - inches			FUSE CLIPS*	
	A	B	C	CENTERS	CAT. NO.
A240T	4-5/8	13/16	5/8	4.0”	C08917P
A480T	5-5/8	13/16	5/8	5.0”	C08917P
A500T	5-5/8	1	9/16	5.0”	-
A720T	9-1/2	13/16	5/8	8.88”	C08917P

*Use 2 clips per fuse.

Standard Fuse Ampere Ratings, Catalog Numbers

E-RATING	CATALOG NUMBER			
	2400V	4800V	5000V	7200V
1/2E	A240T1/2E	A480T1/2E	A500T1/2E-1	-
1E	A240T1E	A480T1E	A500T1E-1	A720T1E-1
2E	A240T2E	A480T2E	-	A720T2E-1
3E	-	A480T3E	A500T3E-1	-
4E	-	A480T4E	-	-
5E	A240T5E	A480T5E	A500T5E-1	-

Standard Fuse Ampere Ratings, Reference Numbers

E-RATING	REFERENCE NUMBER			
	2400V	4800V	5000V	7200V
1/2E	P212855	C215397	S218470	-
1E	P213867	D215904	D219515	E211305
2E	A214383	H216414	-	P211820
3E	-	Q216927	G222715	-
4E	-	C217444	-	-
5E	Y214887	M217959	W201568	-

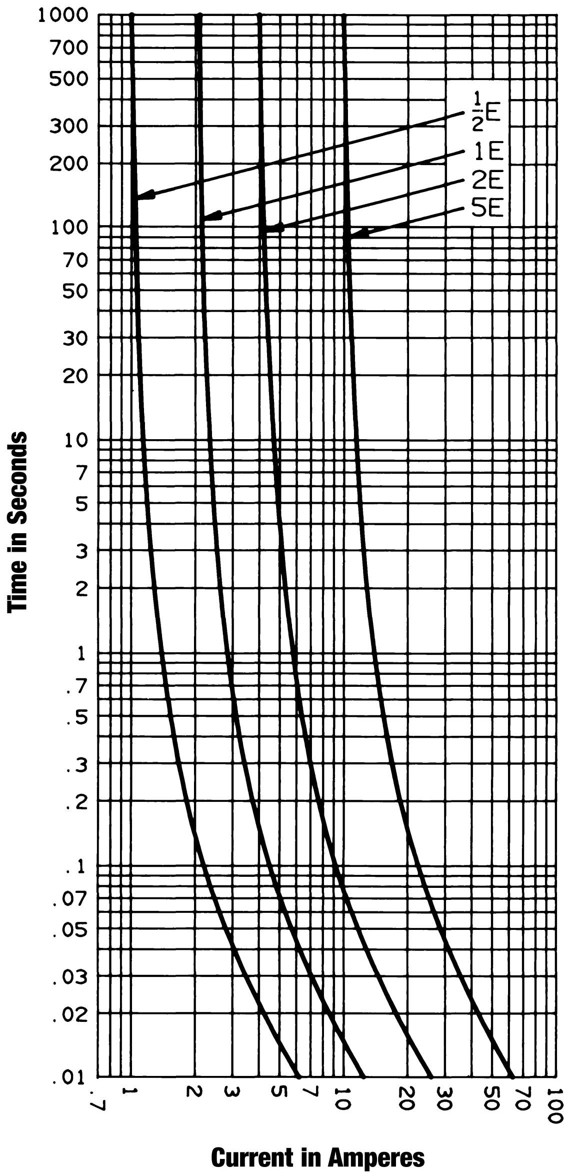
Ferraz Shawmut

E-Rated

A240T, A480T, A500T, A720T

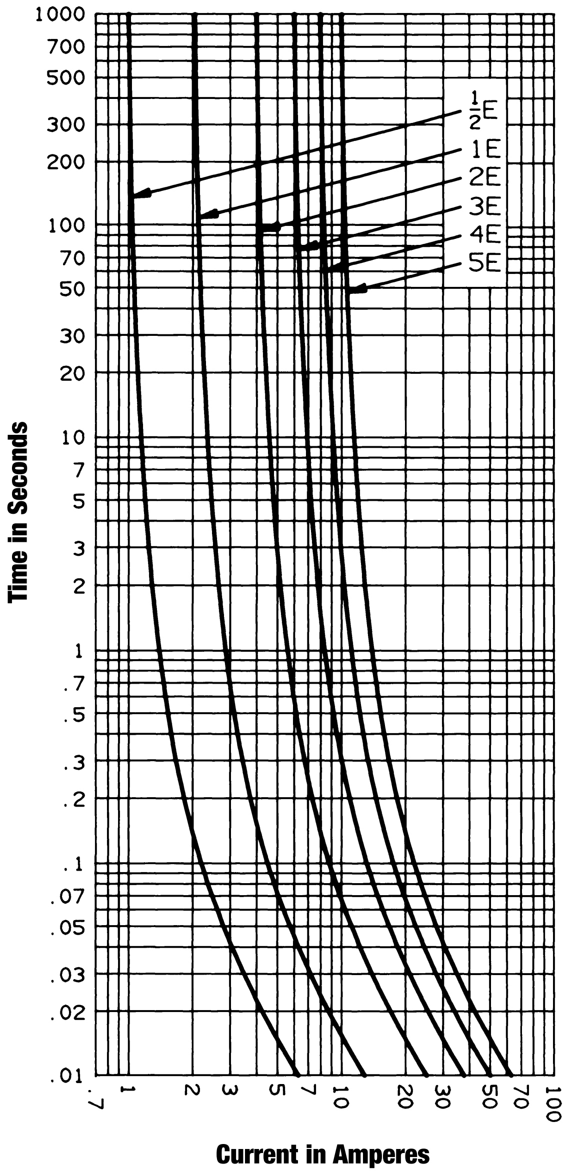
A240T1/2E to 5E

Melting Time – Current Data - PT Fuses - 2400V



A480T1/2E to 5E

Melting Time – Current Data - PT Fuses - 4800V

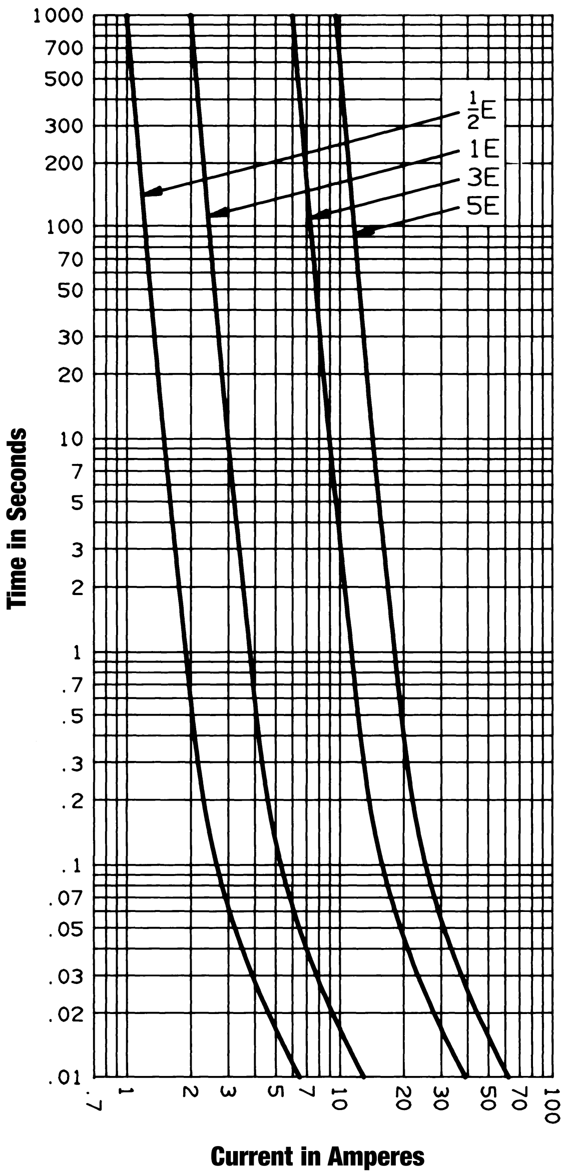


E-Rated

A240T, A480T, A500T, A720T

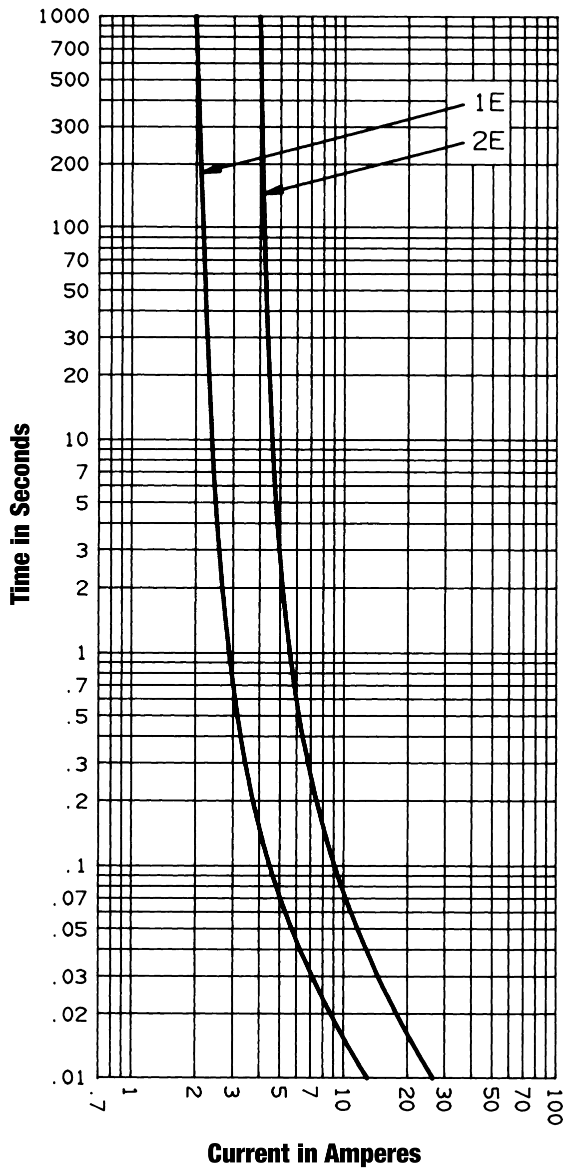
A500T1/2E-1 to 5E-1

Melting Time – Current Data - PT Fuses - 5000V



A720T1E-1 and A720T2E-1

Melting Time – Current Data - PT Fuses - 7200V



R-Rated

A240R, A480R



R-RATED MOTOR STARTER FUSES

Amp-trap® R-rated fuses are current-limiting, high interrupting rating fuses intended for the short-circuit protection of medium voltage motors and motor controllers. R-rated fuses have a minimum interrupting rating and must be coordinated with overload relays in combination motor starters. The motor starter manufacturer generally specifies the R-rated fuse size to the starter. Amp-trap R-rated fuses arE-Rated 2R to 36R, at 2.4, 4.8, and 7.2kV. 4.8 and 7.2kV fuses are UL Recognized. The 4.8kV (A480R) is available with hookeye tab. The 7.2kV (A072F) series has the same dimensions as the 4.8kV (A480R), allowing smaller 7.2kV equipment or 4.8kV upgrades. The A072B is a bolt-in 7.2kV fuse.

HIGHLIGHTS:

- ✔ R-Rated
- ✔ UL Recognized

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APPLICATIONS:

- ✔ Short circuit protection of medium voltage motors and motor controllers

Features/Benefits

- ✔ **Ferrule mounting** for standard clips and interchangeability with other brands of fuses
- ✔ **7.2kV A072F series** has the same dimensions as 4.8kV fuses, allowing compact, higher voltagE-Rated equipment designs
- ✔ **A072B optional bolt-in design** for 7.2kV design flexibility
- ✔ **Optional hookeye on A480R** for non load-break isolation by hookstick
- ✔ **A480R and A072 series UL recognized** for equipment compatibility

Ratings

- ✔ **A240R**
  AC: 2R to 36R
  2750V, 45kA I.R. Sym.
- ✔ **A480R**
  AC: 2R to 36R
  5500V, 63kA I.R. Sym.
- ✔ **A072F**
  AC: 2R to 24R
  7200V, 50kA I.R. Sym.
- ✔ **A072B**
  AC: 2R to 24R
  7200V, 50kA I.R. Sym.

Approvals

- ✔ UL Recognized Component
  A480R @ 5080V, 50kA, Sym.
  A072F @ 7200V, 50kA, Sym.
  A072B @ 7200V, 50kA, Sym.
- ✔ Ferraz Shawmut Certified
  A240R @ 2750V, 45RA, Sym.

R-Rated

A240R, A480R

A240R

2.4kV Ferrule Style

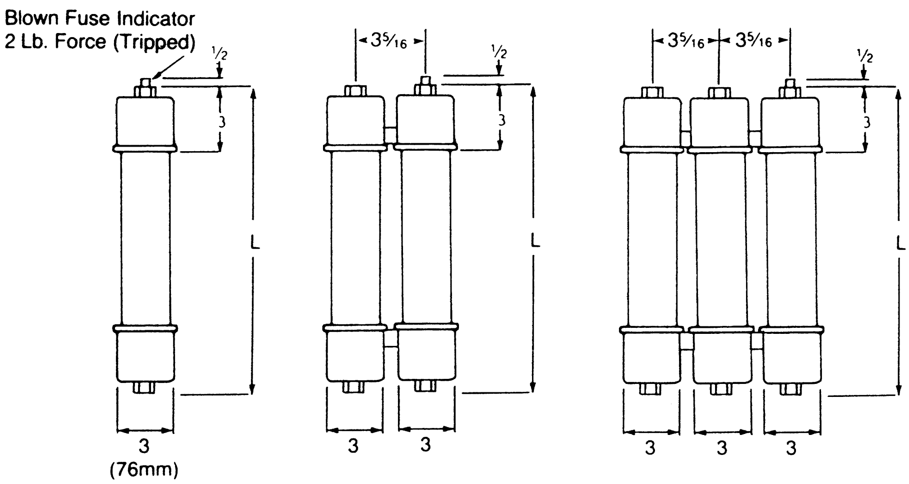


Figure A   Figure B   Figure C

Reference Numbers, Ratings, Dimensions, 2.4kV

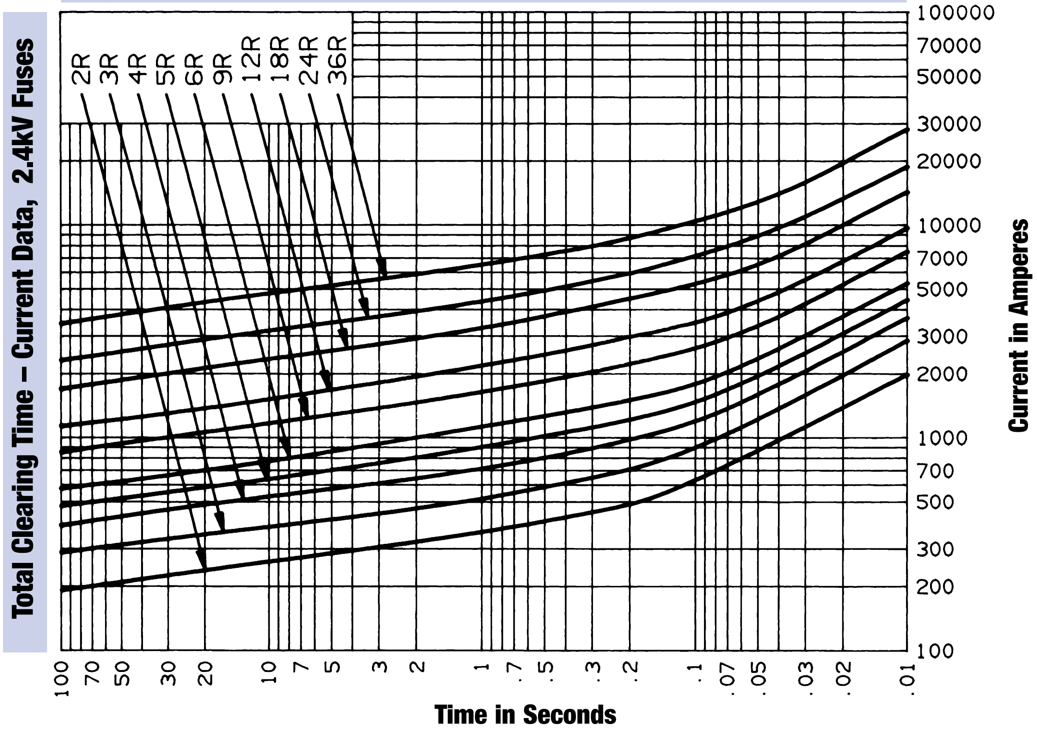
FIG.	CATALOG NUMBER	REFERENCE NUMBER	SIZE	CONTINUOUS AMPERE RATING at 40Þ	DIM. L	MINIMUM INTERRUPTING RATING RMS AMPERES	1 PHASE INTERRUPTING RATING: UL COMPONENT RECOGNITION RMS Asym	UL COMPONENT RECOGNITION RMS Sym	MAXIMUM TESTED RMS Asym	MAXIMUM TESTED RMS Sym
	STANDARD									
A240R										
A	A240R2R	J201557	2R	70	10-7/8 (276mm)	170	-	-	70kA @ 2750V	45kA @ 2750V
	A240R3R	F211812	3R	100		250				
	A240R4R	E212846	4R	130		340				
	A240R6R	E213858	6R	170		500				
	A240R9R	P214373	9R	200		760				
	A240R12R	R219504	12R	230		1000				
B	A240R18R	N221962	18R	390		1500				
	A240R24R	L223225	24R	450		1950				
C	A240R36R	W211297	36R**	650		2900				

* This rating defines the fuse's long-term thermal capability per ANSI C37 46-1981 and should not be the sole factor for selecting a specific R-rating.
** Not recommended for use in fuse clips which grasp only one barrel.

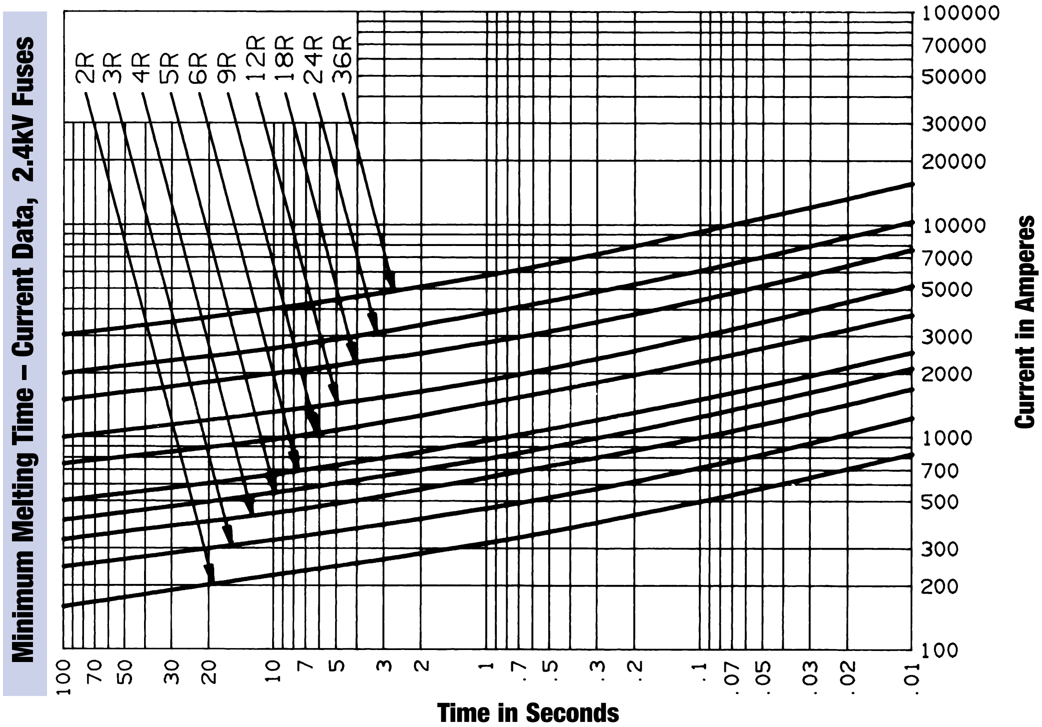
R-Rated

A240R, A480R

A240R2R to 36R, 2400 Volts



A240R2R to 36R, 2400 Volts

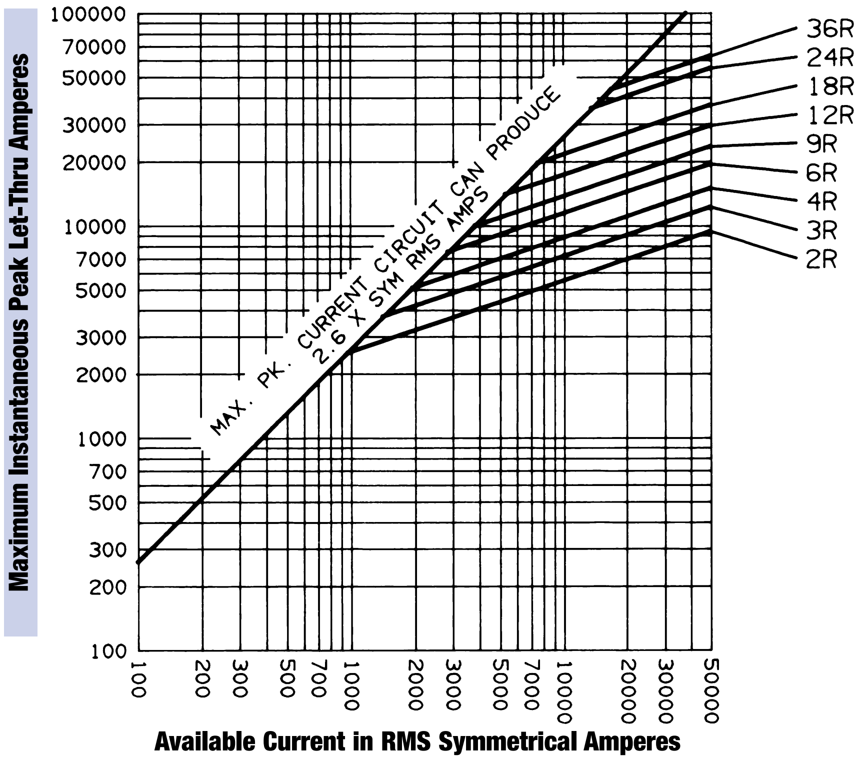


R-Rated

A240R, A480R

A240R2R to 36R, 2400 Volts

Peak Let-Thru Current Data, R-Rated Fuses



R-Rated | A240R, A480R

A480R

4.8kV Ferrule Style

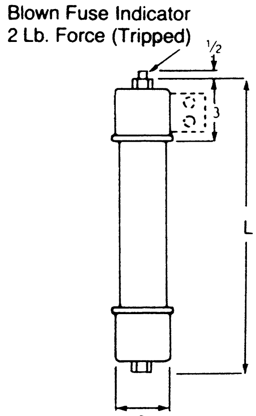


Figure A

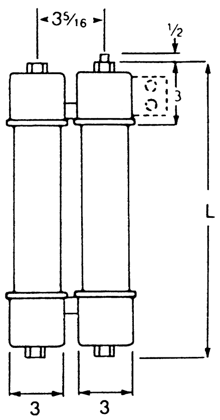


Figure B

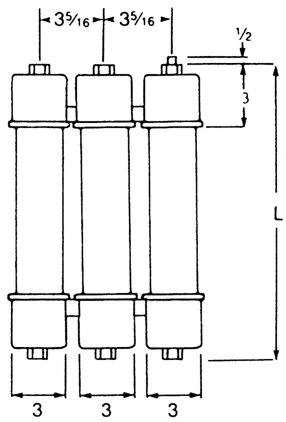
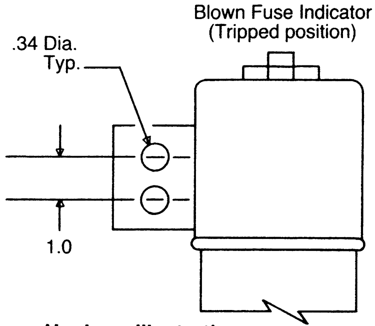


Figure C



Hookeye Illustration

Reference Numbers, Ratings, Dimensions, 4.8kV

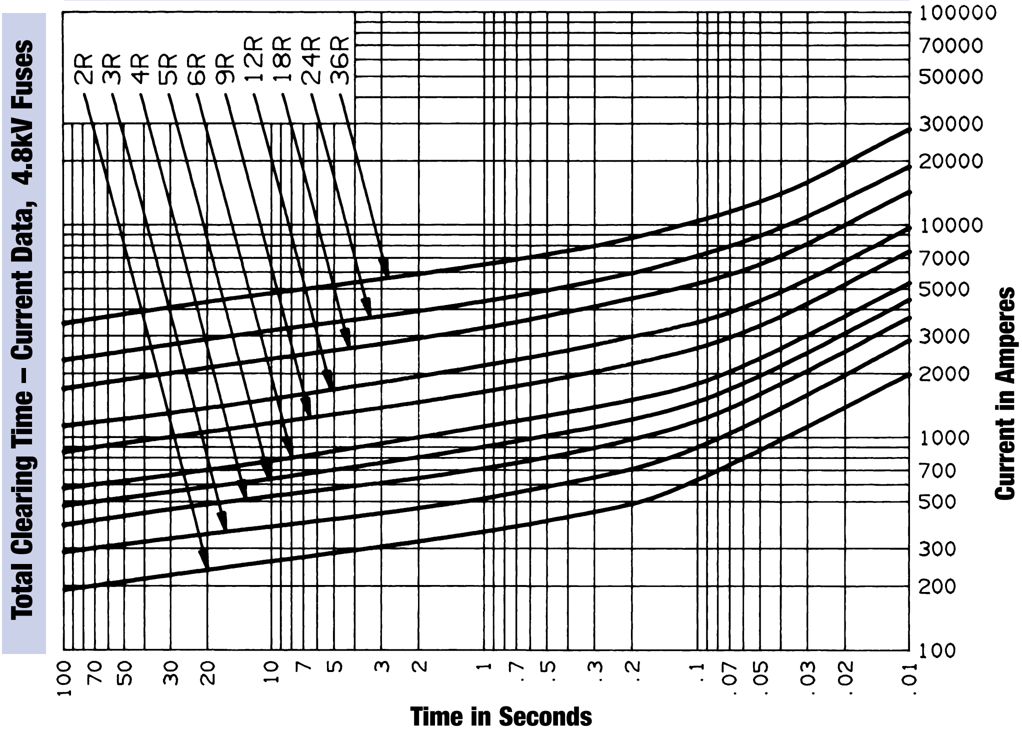
FIG.	CATALOG NUMBER (STANDARD)	REFERENCE NUMBER (STANDARD)	SIZE	CONTINUOUS AMPERE RATING at 40°C	DIM. L	MINIMUM INTERRUPTING RATING RMS AMPERES	1 PHASE INTERRUPTING RATING: UL COMPONENT RECOGNITION RMS Asym	UL COMPONENT RECOGNITION RMS Sym	MAXIMUM TESTED RMS Asym	MAXIMUM TESTED RMS Sym
A480R-1										
A	A480R2R-1	P221963	2R	70	15-7/8 (403mm)	190	80kA @ 5080V	50kA @ 5080V	100kA @ 5500V	63kA @ 5500V
A	A480R3R-1	K201558	3R	100		225				
A	A480R4R-1	G211813	4R	130		330				
A	A480R5R-1	Q213362	5R	150		400				
A	A480R6R-1	Q214374	6R	170		500				
A	A480R9R-1	W215897	9R	200		740				
A	A480R12R-1	N214878	12R	230		955				
B	A480R18R-1	Z216406	18R	390		1440				
B	A480R24R-1	H218461	24R	450		1910				
C	A480R36R-1	C201045	36R**	650		2810				
A480R-1HE with hookeye										
A	A480R2R-1HE	X222706	2R	70	16-1/8 (410mm)	190	80kA @ 5080V	50kA @ 5080V	100kA @ 5500V	63kA @ 5500V
A	A480R3R-1HE	S203428	3R	100		225				
A	A480R4R-1HE	R212328	4R	130		330				
A	A480R5R-1HE	F213859	5R	150		400				
A	A480R6R-1HE	P214879	6R	170		500				
A	A480R9R-1HE	A216407	9R	200		740				
A	A480R12R-1HE	S215388	12R	230		955				
B	A480R18R-1HE	G216919	18R	390		1440				
B	A480R24R-1HE	A218983	24R	450		1910				

* This rating defines the fuse's long-term thermal capability per ANSI C37 46-1981 and should not be the sole factor for selecting a specific R-rating.
** Not recommended for use in fuse clips which grasp only one barrel.

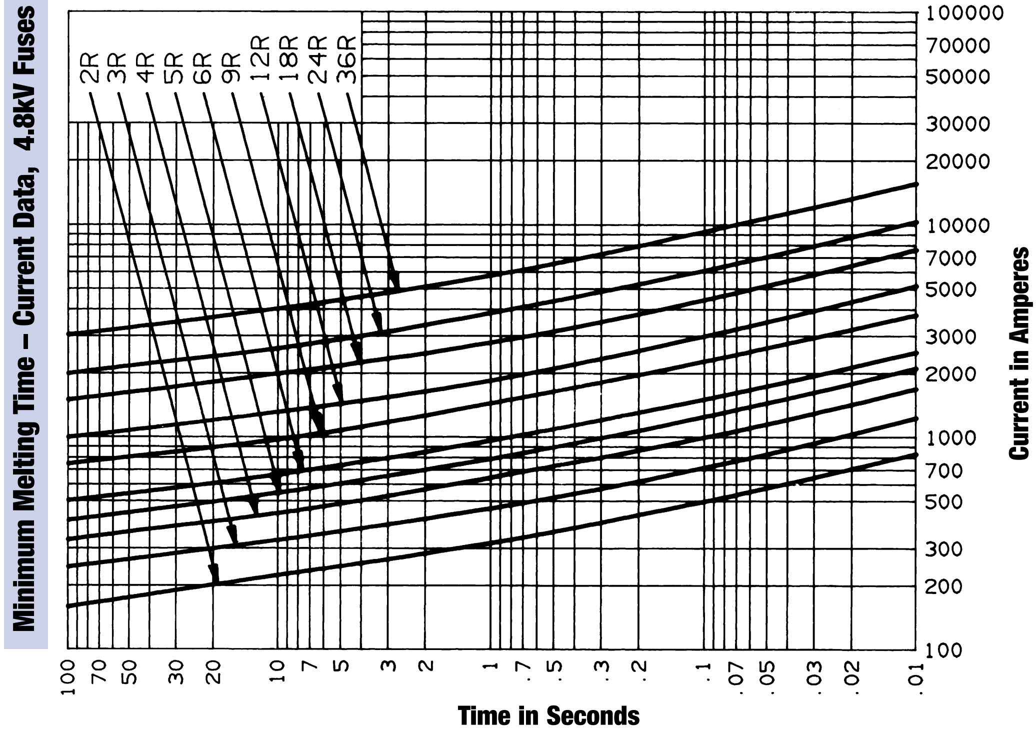
R-Rated

A240R, A480R

A480R2R to 36R-1, 4800 Volts and A480R2R to 24R-1HE, 4800 Volts



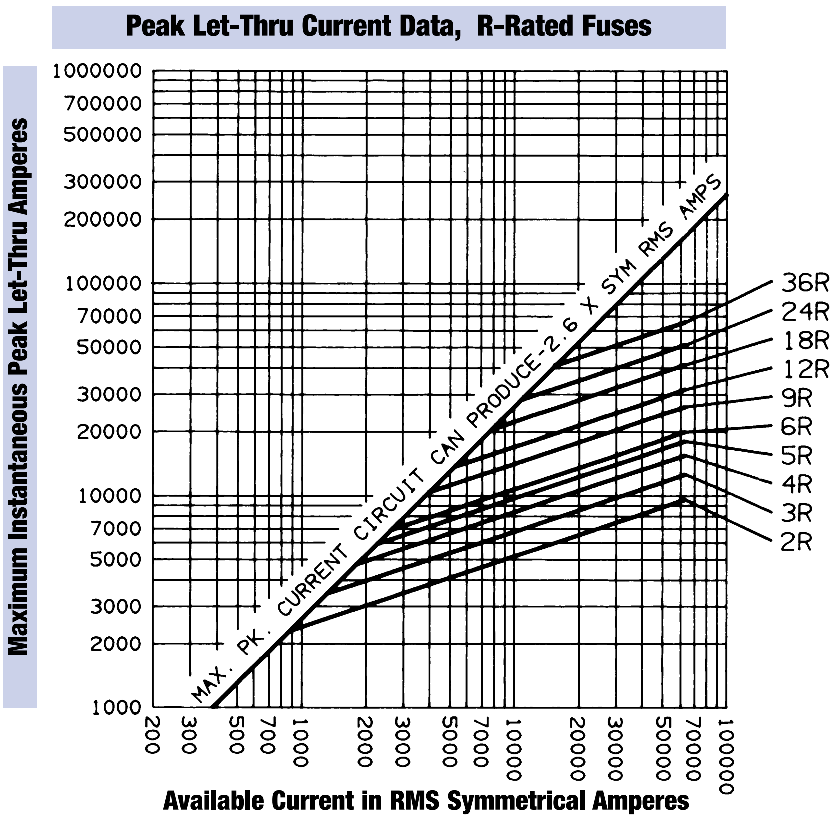
A480R2R to 36R-1, 4800 Volts and A480R2R to 24R-1HE, 4800 Volts



R-Rated

A240R, A480R

A480R2R to 36R-1, 4800 Volts and A480R2R to 24R-1HE, 4800 Volts



Medium Voltage Fuses

North American Power Fuses

Capacitor Fuses

600 V AC to 4000 V AC
From 25 A to 250 A

- **CARTRIDGE TYPE**
- **FULL RANGE OPERATION**
- **INDICATOR FOR MOST TYPES**
- **DIRECT MOUNTING ON CAPACITOR**
- **PREVENTS RUPTURE OF FAILED CAPACITOR**
- **SPECIAL MOUNTING BRACKETS AVAILABLE**



RATINGS TABLE

AMPERE RATING	CAPACITOR FUSE STYLE AND VOLTAGE RATING						
	AUU 600 V	BYU 1000 V	BTR 1200 V	BTR 1800 V	BYU 2000 V	BYU 3000 V	BYU 4000 V
25	•		•	•			
60	•	•	•	•		•	
100	•	•	•	•	•	•	•
125	•	•	•	•	•	•	•
150	•		•	•	•	•	
175	•		•	•	•		
200	•		•		•		
225	•					•	
250							

As a complement to the wide variety of fuse lines developed by Ferraz Shawmut for every market and application type, we also offer a line of capacitor fuses ranging from 600 V AC to 4000 V AC.

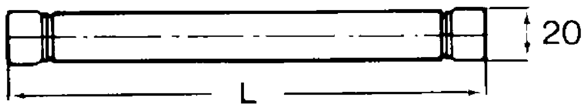
The Ferraz Shawmut capacitor fuse range offers many models with the same electrical ratings but with various blade, stud, or end-contact designs in order to satisfy specific customer needs.

European Fuses

Potential Transformer Fuses

Fuses for the protection of low power receptors

Complying with IEC 282-1 standard
Interior equipment





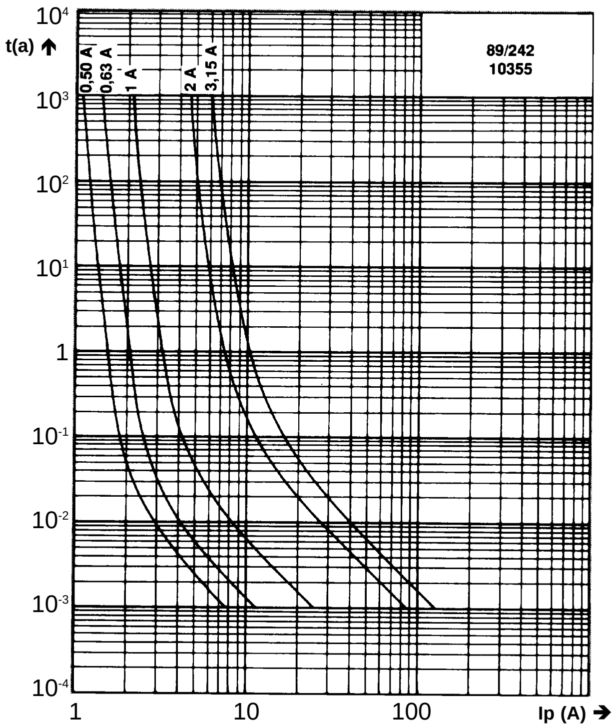
Rated voltage (kV)	L (mm)	Rating I_N (A)	Catalog number [(1)]	Ref. Nº	Weight (kg)
5,5	127	0,63	5 500 CP gL 20x127 / 0,63	F076802	0,08
		1	5 500 CP gL 20x127 / 1	G076803	0,08
		2	5 500 CP gL 20x127 / 2	J076805	0,08
		3,15	5 500 CP gL 20x127 / 3,15	K076806	0,08
7,2	190	0,63	7 200 CP gL 20x190 / 0,63	V077850	0,12
		1	7 200 CP gL 20x190 / 1	W077851	0,12
		2	7 200 CP gL 20x190 / 2	Y077853	0,12
		3,15	7 200 CP gL 20x190 / 3,15	Z077854	0,12
8,25	190	0,63	8 250 CP gL 20x190 / 0,63	D095775	0,12
		1	8 250 CP gL 20x190 / 1	E095776	0,12
		2	8 250 CP gL 20x190 / 2	F095778	0,12
		3,15	8 250 CP gL 20x190 / 3,15	H095779	0,12
12	254	0,63	12 000 CP gL 20x254 / 0,63	L076807	0,16
		1	12 000 CP gL 20x254 / 1	M076808	0,16
		2	12 000 CP gL 20x254 / 2	P076810	0,16
		3,15	12 000 CP gL 20x254 / 3,15	Q076811	0,16
15,5	254	0,63	15 500 CP gL 20x254 / 0,63	K095827	0,16
		1	15 500 CP gL 20x254 / 1	V097814	0,16
		2	15 500 CP gL 20x254 / 2	W097815	0,16
		3,15	15 500 CP gL 20x254 / 3,15	H220025	0,16
24	340	0,63	24 000 CP gL 20x340 / 0,63	N078235	0,215
25,5	340	0,5	25 500 CP gL 20x340 / 0,5	D039915	0,215

Note: These fuses are never equipped with a trip-indicator. Connecting clips MR 20,6.

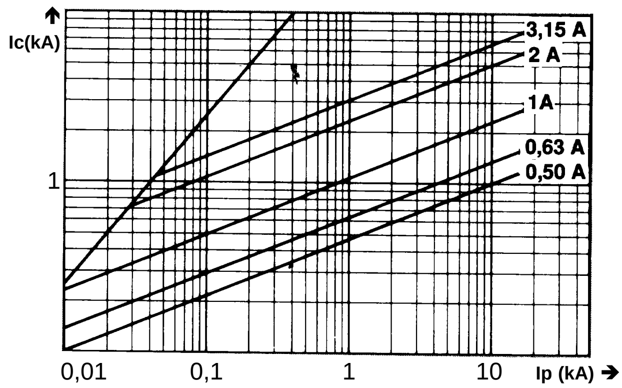
Potential Transformer Fuses

Electrical data on fuses for the protection of low power receptors

Time-current characteristics



Cut-off characteristics



Ip = RMS value of short-circuit prospective current
t(s) = Pre-arcing time
Ic = Cut-off current

Rated voltage (kV)	L (mm)	Rating I_N (A)	Synchronized breaking capacity (kA)	Peak arc voltage (kV)	Power dissipation at I_N (W)
5,5	127	0,63	20	22	1,6
		1	20	22	1,8
		2	20	22	2,5
		3,15	20	22	4,1
7,2 / 8,25	190	0,63	20	25 /33	1,9 / 2,5
		1	20	25 /33	2,2 / 2,9
		2	20	25 /33	3,1 / 4,1
		3,15	20	25 /33	6,0 / 6,7
12 / 15,5	254	0,63	20 /16	42 / 62	3,2 / 4,8
		1	20 / 16	42 /62	3,6 / 5,6
		2	20 / 16	42 / 62	5,2 / 7,8
		3,15	20 / 16	42 / 62	8,6 / 13
24	340	0,63	16	84	6,7
25,5	340	0,5	16	102	11,8

UTE Fuses

TYPE FR
TENSIONS ASSIGNÉES 12 et 24 kV
COURANTS ASSIGNÉS 6,3 À 63 A

- COUPE-CIRCUIT HAUTE TENSION DESTINÉ À LA PROTECTION DES TRANSFORMATEURS
- RÉSISTANCE MÉCANIQUE RENFORCÉE
- HAUTE TENUE AUX CONTRAINTES DE MISE EN ŒUVRE
- UTILISATION INTÉRIEURE
- STRUCTURE ENTIÈREMENT SYNTHÉTIQUE
- CONFORMES AUX NORMES UTE C 64110, UTE C 64200, UTE C 64203, CEI 282-1
- MODÈLE A PERCUTEUR CONFORME A LA CEI 420



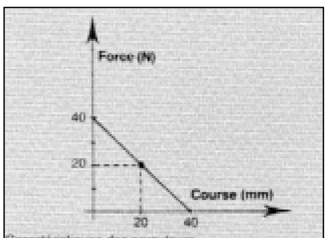
PRÉSENTATION

Les fusibles FR sont destinés à la protection des transformateurs de distribution HTA/BT. Du type associé, ces coupe-circuits limiteurs interromptent les courants de défauts avant qu'ils atteignent leur valeur maximale. La coupure, totalement enfermée dans l'enveloppe du fusible, est assurée très rapidement sans aucune manifestation extérieure.
Les principaux éléments constitutifs sont :
- une enveloppe tubulaire en matériau synthétique de classe d'isolement F
- des contacts d'extrémités en aluminium nickelé
- des éléments fusibles en argent de haute pureté
- un support d'éléments fusibles en composite pour haute température

De par leur structure à base de matériau synthétique, les fusibles FR répondent parfaitement aux contraintes de mise en œvre dans les cellules HTA et les puits fusibles.

CARACTÉRISTIQUES TECHNIQUES

Tension assignée Un : 24 kV
Courants assignés In : 6,3 - 16- 32 - 43 - 63 A
Courant minimal de coupure I_3 : selon tableau ci-dessous
Pouvoir de coupure I_1 : 12 500 A
Plage de température d'utilisation : -25°C - +40°C
Percuteur : énergie minimale de 0,5 Joules pour une course minimale de 20 mm.



Caractéristiques des percuteurs
Characteristics of trip-indicators

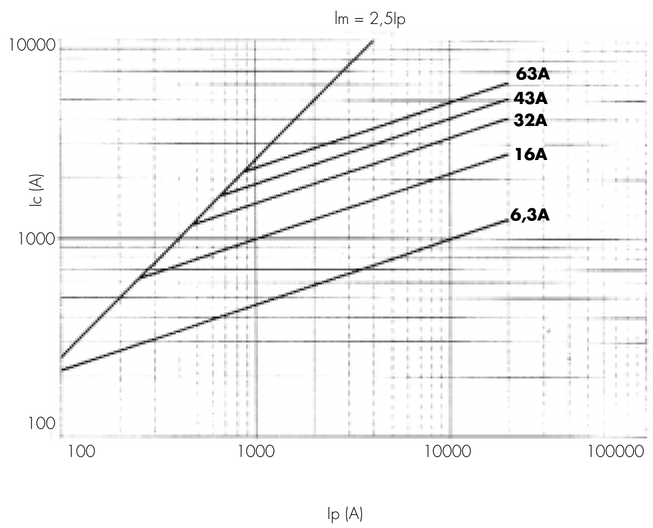
Medium Voltage Fuses

European Fuses

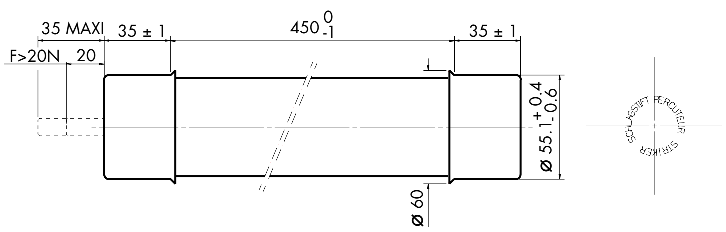
UTE Fuses

Tension assignée Un (kV)	Courant assigné In (A)	Dimensions L (mm)	Dimensions D (mm)	Courant minimal de coupure (A)	Pouvoir de coupure (kA)	Tension crête de coupure (kV)	Puissance dissipée à In (w)	I^2 t de fonctionnement total sous Un (10^3A^2s)	Poids (kG)
12	6,3	520	55	31,5	12,5	34	25	0,3	2,1
12	16	520	55	80	12,5	34	53	1,6	2,1
12	32	520	55	160	12,5	34	89	6	2,1
12	43	520	55	215	12,5	34	123	12	2,1
12	63	520	55	315	12,5	34	142	24	2,1
24	6,3	520	55	31,5	12,5	58	25	0,63	2,1
24	16	520	55	80	12,5	58	53	3,3	2,1
24	32	520	55	160	12,5	58	89	13	2,1
24	43	520	55	215	12,5	58	123	25	2,1
24	63	520	55	315	12,5	58	142	50	2,1

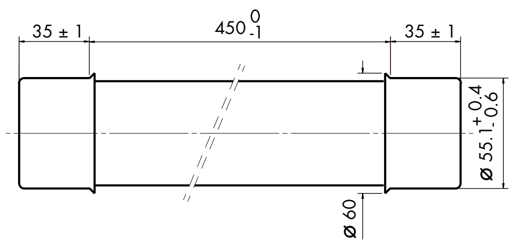
Caractéristiques d'amplitude du courant coupé 15262 A



Plans dimensionnels avec percuteur



Plans dimensionnels sans percuteur



Ferraz Shawmut

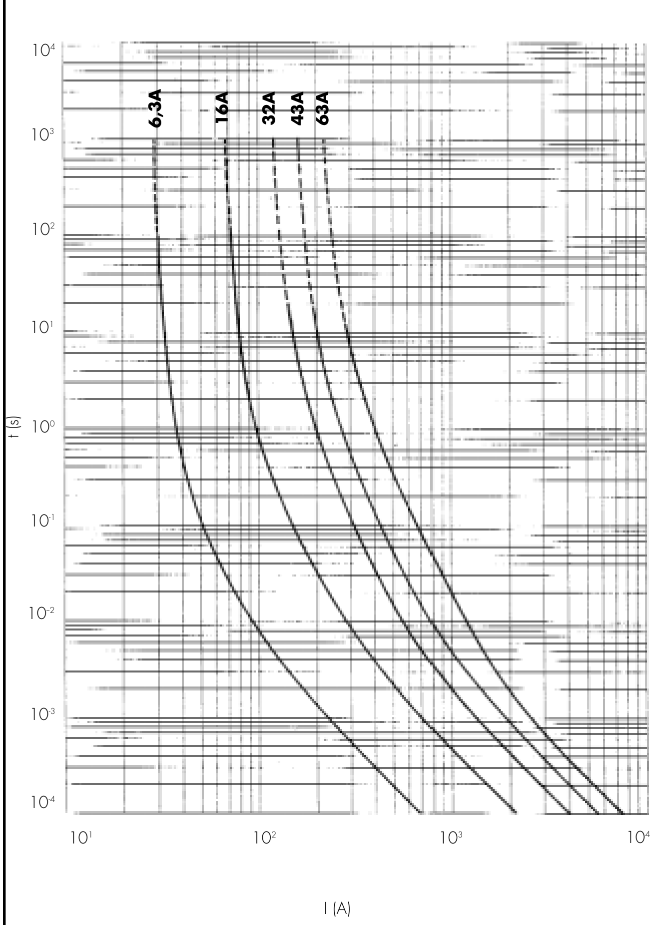
European Fuses

UTE Fuses

CARACTERISTIQUE TEMPS-COURANT

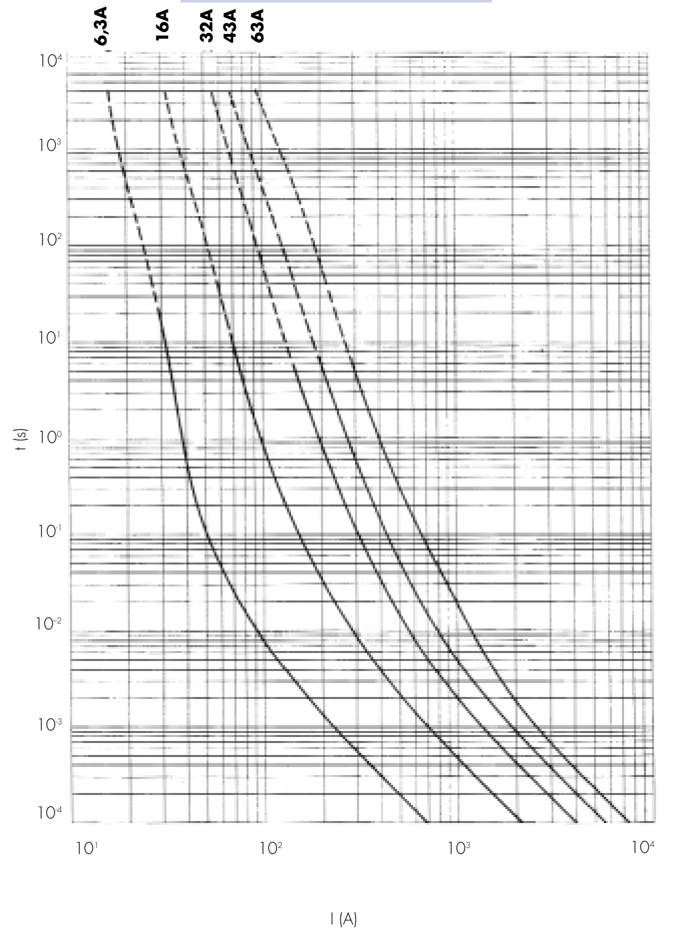
15262 A

Type FR 12/24 sans percuteur



15680 A

Type FR 12/24 P avec percuteur



GUIDE D'UTILISATION

Tension nominale du réseau (kV)	**PRÉCONISATION EDF** Puissance nominale du transformateur						
	50	100	160	250	400	630	1000
10	6,3	16	32	32	63	63	
15	6,3	16	16	16	43	43	63
20	6,3	6,3	16	16	43	43	43*

UTE Fuses

* On admet l'installation d'un fusible 63 A au lieu de 43 A dans le cas d'une utilisation en compartiments étanches

Tension nominale du réseau	**PRÉCONISATION C 13100** Puissance nominale du transformateur																
(kV)	25	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250
10	6,3	6,3	6,3	6,3	16	16	16	32	32	32	63	63	63	63			
15	6,3	6,3	6,3	6,3	6,3	16	16	16	16	16	43	43	43	43	43	63	
20	6,3	6,3	6,3	6,3	6,3	6,3	6,3	16	16	16	16	43	43	43	43	43	63

REFERENCES

Tension assignée Un (kV)	Courant assigné In (A)	Sans percuteur			Avec percuteur	
		TYPE	N° de nomenclature EDF (pour 3 fusibles)	N° Référence	TYPE	N° Référence
12	6,3	FR 12/6,3		X210240	FR 12/6,3 P	D210246
12	16	FR 12/16	73.02.136	Y210241	FR 12/16 P	E210247
12	32	FR 12/32	73.02137	Z210242	FR 12/32 P	F210248
12	43	FR 12/43		A210243	FR 12/43 P	G210249
12	63	FR 12/63	73.02.138	B210244	FR 12/63 P	H210250
24	6,3	FR 24/6,3	73.02.132	B210014	FR 24/6,3 P	G209996
24	16	FR 24/16	73.02.133	C210015	FR 24/16 P	H209997
24	32	FR 24/32		C210245	FR 24/32 P	J210251
24	43	FR 24/43	73.02.134	D210016	FR 24/43 P	J209998
24	63	FR 24/63	73.02.135	E210017	FR 24/63 P	K209999

DIN Fuses

IBD

7.2 UP TO 36 KV

- HIGH-VOLTAGE FUSES DESIGNED FOR POWER TRANSFORMER PROTECTION
- INTERIOR/EXTERIOR USE
- CERAMIC HOUSING
- "MEDIUM" CLASS TRIP-INDICATOR
- COMBINED WITH A LOWERED MINIMUM BREAKING CURRENT
- COMPLIES WITH IEC 282-1, DIN 43625 AND VDE 0670/4 RECOMMENDATIONS
- COMPLIES WITH APPLICATION RULES OF IEC PUBLICATION 787



PRESENTATION

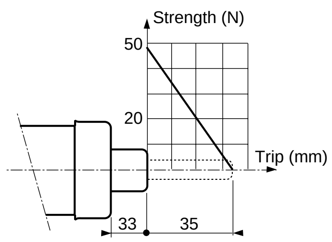
IBD fuses are designed for the protection of HV/LV distribution transformers. The fuse technology is known as "enclosed" melting. It ensures against any visible evidence of the fuse during its operation.
The main features include:

- enameled ceramic housing
- nickle-plated brass end caps
- solid silver fuse elements
- waterproof system for outdoor use.

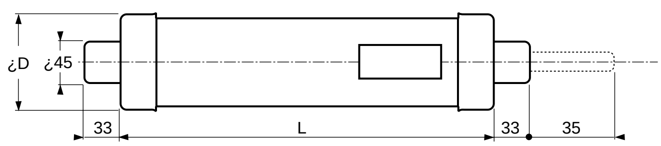
IBD fuses satisfy existing operational constraints for electric networks.

Their characteristics are based on operation at ambient temperatures ranging from -25°c to +40°c, and a maximum altitude of 1,000 meters.

Trip indicator features



Dimensions (mm)



MAIN CHARACTERISTICS

Rated voltage Un (Kv)	Rated current In (A)	Dimensions L (mm)	Dimensions D (mm)	Ref. Number	Minimum breaking current (A)	Breaking capacity (KA)	Maximum breaking voltage (Kv)	Power losses @ In (W)	Total I^2t @ Un (10^3A^2S)	Weight (kg)
3/7.2	6.3	192	D1 = 53	S209293	31	25	23	3.5	0.9	1.1
	10			T209294	20	50	23	8.9	1.82	1.1
	16			V209295	35	50	23	15	8.3	1.1
	20			W209296	52	50	23	15	11	1.1
	25			X209297	76	50	23	16	14	1.1
	31.5			Y209298	102	50	23	20	19	1.1
	40			Z209299	128	50	23	28	25	1.1
	50		D2 = 73	A209300	159	50	23	29	48	1.8
	63			B209301	210	50	23	35	60	1.8
	80			C209302	280	25	23	53	160	1.8
	100			D209303	350	25	23	67	205	1.8
6/12	6.3	292	D1 = 53	F209305	31	25	37	12	0.9	1.6
	10			G209306	20	50	37	19	1.82	1.6
	16			H209307	34	50	37	27	8.3	1.6
	20			J209308	51	50	37	28	11	1.6
	25			K209309	76	50	37	29	14	1.6
	31.5			L209310	101	50	37	36	19	1.6
	40			M209311	125	50	37	50	25	1.6
	50		D2 = 73	N209312	159	50	37	52	48	2.6
	63			P209313	210	50	37	64	60	2.6
	80			Q209314	290	25	37	115	160	2.6
	100			R209315	350	25	37	120	205	2.6
10/17.5	6.3	292	D1 = 53	T209317	31	25	55	14	4.5	1.6
	10			V209318	20	50	55	30	22	1.6
	16			W209319	35	50	55	40	28	1.6
	20			X209320	52	50	55	42	31	1.6
	25			Y209321	78	50	55	45	34	1.6
	31.5			Z209322	104	50	55	55	39	1.6
	40			A209323	125	50	55	82	42	1.6
	50		D2 = 73	consultus	159	50	55	80	50	1.6
	63			consultus	210	50	55	100	107	2.6
	80			consultus	280	25	55	160	166	2.6
	100			consultus	350	25	55	185	202	2.6
10/24	6.3	442	D1 = 53	S209339	31	25	70	20	4.5	2.3
	10			T209340	20	50	70	42	22	2.3
	16			V209341	35	50	70	57	28	2.3
	20			W209342	52	50	70	60	31	2.3
	25			X209343	78	50	70	64	34	2.3
	31.5			Y209344	104	50	70	77	39	2.3
	40			Z209345	128	50	70	115	42	2.3
	50		D2 = 73	A209346	150	50	70	118	50	2.3
	63			B209347	200	50	70	140	107	3.9
	80			consultus	290	20	70	225	166	3.9
	100			consultus	350	20	70	260	208	3.9
	50	537	D2 = 73	M209357	150	50	70	108	50	4.6
	63			N209358	200	50	70	130	107	4.6
	80			consultus	290	25	70	215	166	4.6
	100			consultus	350	25	70	240	208	4.6
20/36	6.3	537	D1 = 53	S209362	31	25	106	32	0.9	2.7
	10			T209363	22	40	106	55	1.82	2.7
	16			V209364	38	40	106	82	8.3	2.7
	20			W209365	57	40	106	85	11	2.7
	25			X209366	85	40	106	87	14	2.7
	31.5		D2 = 73	Y209367	102	40	106	125	19	4.6
	40			Z209368	135	40	106	164	25	4.6

European Fuses

DIN Fuses

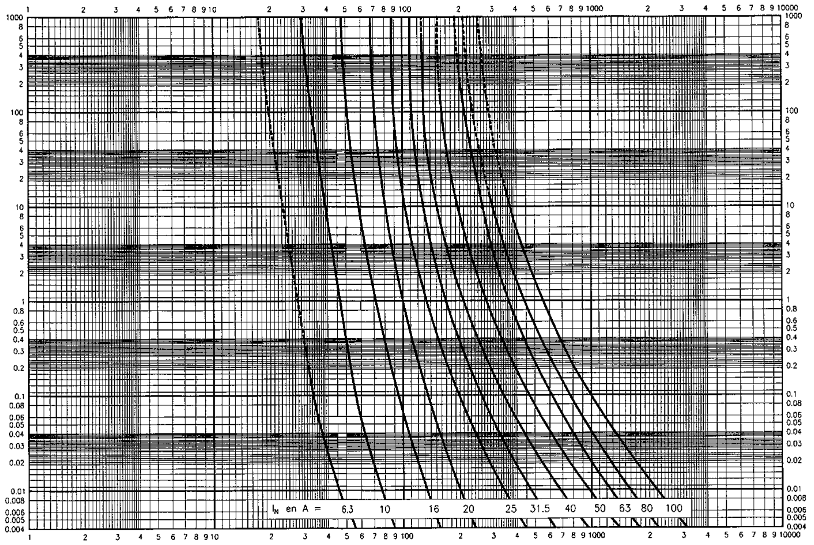
MAIN CHARACTERISTICS

Time vs. current characteristics

7.2 Kv
12 Kv
17.5 Kv
24 Kv

t(s)

Prearcing time in seconds



Current in Amps. (mean values)

Mean tolerance : ± 20 % for current

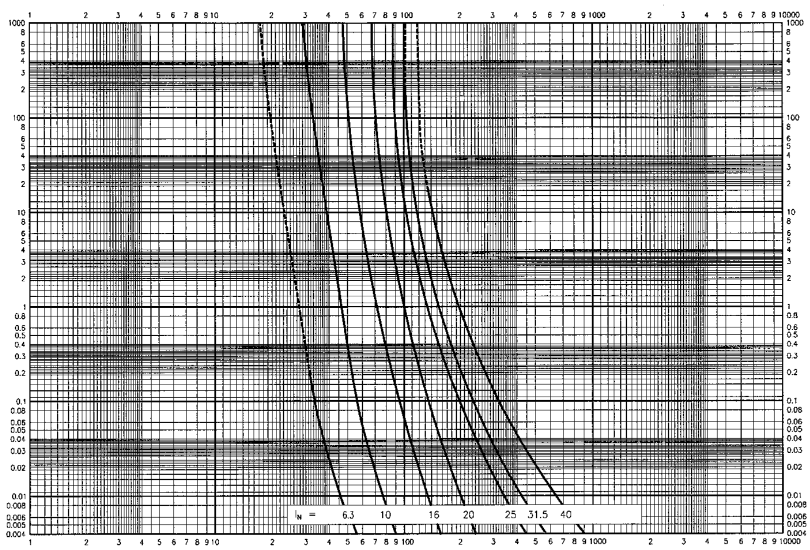
Ip (A)

Time vs. current characteristics

36 Kv

t(s)

Prearcing time in seconds



Current in Amps. (mean values)

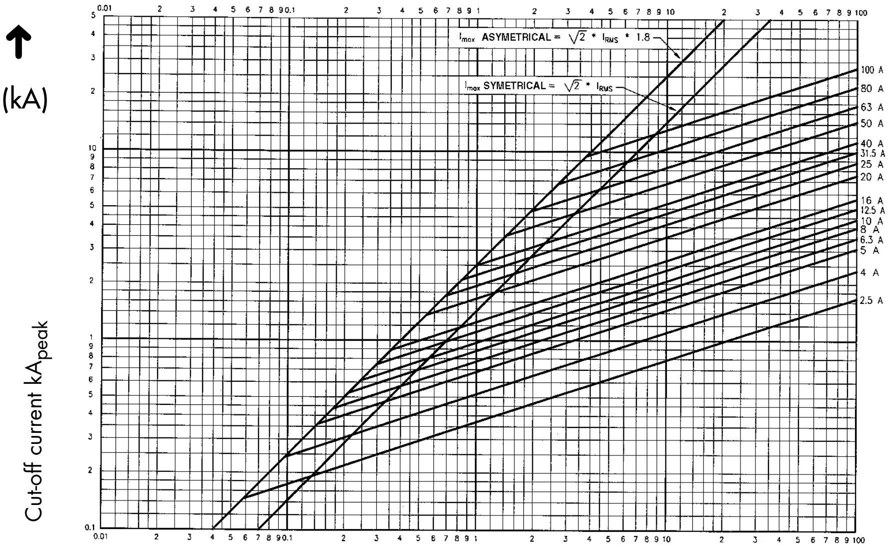
Mean tolerance : ± 20 % for current

Ip (A)

DIN Fuses

Cut-off current characteristics

Ic (kA) ↑



Available short-circuit current kA_{rms}

Ip (kA) →

7.2 à 36 Kv

SELECTION GUIDE

The selection of fuses for the protection of HV/LV transformers must take into account:

a) transient currents occuring in the installation when the transformer power is switched on

b) overload currents related to normal operation of the transformer and liable to cause premature agin.

As a rule of thumb:
Fuse rating ≥ 1.7 x transformer rated current

This relationship is given for an ambient temperature not exceeding 40°c. Beyond this, a derating factor A1 must be used

$$A1 = \sqrt{\frac{120-\theta}{80}}$$

with θ = ambient temperature in °c.

E.g., a 40A rated fuse installed under 60°c ambient must be treated as a 34A rated fuse.

$$A1 = \sqrt{\frac{120-60}{80}} = 0.86$$

The table, opposite, may also be used. It has been computed using peak transient currents from 8 to 15 times the transformer current rating and a 130 % overload rate.

Using this table also means applying the temperature derating factor A1 to the selected rating when ambient exceeds 40°c in the fuse environment.

Transformer power (kVA)	**Operating voltage** (kV)							
	3.3	**5/5.5**	**6/6.6**	**10/11**	**13.8**	**15**	**20/22**	**30/33**
25	16	10	10	6.3	6.3	6.3	6.3	6.3
50	25	16	16	10	10	10	6.3	6.3
63	25	20	20	16	10	10	6.3	6.3
80	31.5	25	25	16	16	10	10	6.3
100	40	31.5	25	20	16	16	10	6.3
125	50	31.5	31.5	25	16	16	16	10
160	50	40	31.5	25	20	16	16	10
200	63	50	40	31.5	20	20	16	16
250	80	63	50	40	25	25	20	16
315	100	100	63	50	31.5	25	25	16
400	–	100	80	63	40	31.5	25	20
500	–	–	100	63	50	40	31.5	25
630	–	–	–	80	50	50	40	31.5
800	–	–	–	100	63	63	50	31.5
1000	–	–	–	–	80	80	50	40
1250	–	–	–	–	100	100	63	–
1600	–	–	–	–	–	–	80	–
2000	–	–	–	–	–	–	100	–

Ground Fault Indicator

Type IDT 10
FOR HIGH VOLTAGE
OVERHEAD NETWORKS
Ref : D210223A

- INDICATES INSULATION FAULTS BY DETECTION OF CURRENTS IN GROUND CIRCUITS
- USABLE ON ALL HIGH VOLTAGE DISTRIBUTION NETWORKS REGARDLESS OF NEUTRAL RATES
- CONNECTS DIRECTLY TO THE GROUND CABLE OF THE POLES
- MAY BE RESET AFTER OPERATION
- OPERATES AUTONOMOUSLY, WITHOUT BATTERIES
- RESISTANT TO TOUGH WEATHER CONDITIONS
- INSENSITIVE TO LIGHTNING AND OPERATING CURRENTS
- DETECTS DAMAGE TO LIGHTNING ARRESTERS, TRANSFORMERS AND INSULATORS



PRESENTATION

The insulation fault indicator is presented in the form of a compact case made of a highly sturdy synthetic material. A window on the front enables the viewing of a red warning light in case of operation. This signal may be seen from 10 meters away, across a 120 ° sector.

Two conductive contacts on the front allow the indicator to be reset.

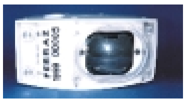
The case contains a 16 mm diameter hole for the passage of a ground cable. The indicator is delivered with an 80 cm cable section and two crimping sleeves to prevent the ground circuit from being cut during installation. Two openings on the back enable the device to be attached to the pole by metal strip.

OPERATION

Ground currents caused by insulation faults are measured by an integrated current transformer. An electronic panel processes the transformer output signal and controls the operation of the warning light in the event it exceeds a preset threshold. The signal is maintained even after power on the line has been disconnected, enabling the operator to quickly detect the fault location.

Resetting and testing of the indicator are ensured by an IDT 101 type reset device.

BEFORE FAULT



AFTER FAULT



Ground Fault Indicator

TECHNICAL CHARACTERISTICS

DETECTION CHARACTERISTICS:

Industrial frequency currents of 50 Hz greater than :
- 8 A with a duration of at least 0.5 seconds
- 10 A with a duration of at least 0.1 second
- Impulse currents (restart faults): 3 waves of 50 A with a minimum duration of at least 5 ms

OPERATING CHARACTERISTICS:

- Interior or exterior use
- Ambient temperature: - 25 °C + 70°C
- Mass: 0.92 Kg
- Dimensions (L x D x H): 187 x 118 x 94 mm
- Protection Index: IP 56

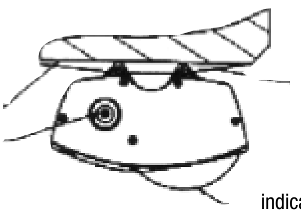
A/ FIXING INDICATOR TO ELECTRIC POLE

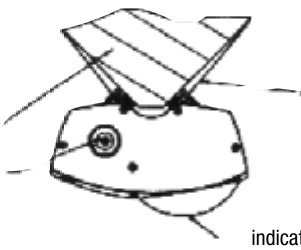
- The indicator is installed in a horizontal position, facing in either direction.
- The indicator may be attached to a wooden or concrete pole.
- On concrete poles, the indicator may be placed either on flat side or in a corner.

The different configurations are described below.

- Two openings located at the back of the case are designed to accommodate a stainless steel strip, 20 mm wide and 0.4 mm thick, in order to fix the indicator to the post by hooping.
- The hole in the indicator case must be positioned as closely as possible to the ground cable.
  WARNING: During attachment, the strip must pass between the ground cable and the post in order to prevent the cable from being tightened against the post during hooping.





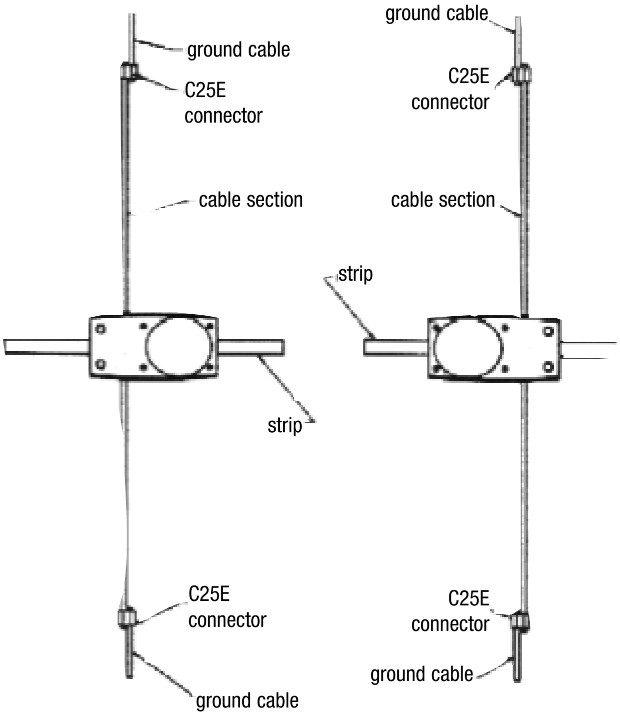


Ground Fault Indicator

B/ CONNECTING THE GROUND CABLE

Once the indicator is attached to the pole:

- Introduce the cable section into the case via the 16 mm hole
- Approximately center the cable section within the case
- Place and crimp a C25 E connector to attach the upper end of the cable section to the ground cable
- Place and crimp the second C25 E connector to attach
- Ensure that both connections are properly completed
- Cut the ground cable just below the upper connector and just above the lower connector
- Remove the piece of ground cable shunted by the cable section



Cabletroll 2500

EARTH FAULT CURRENT
SENSING SYSTEM

- FAULT SENSING IN FAULTY SECTIONS OF UNDERGROUND NETWORKS
- FOR INDOOR OR OUTDOOR CABLES UP TO 36KV
- PROGRAMMABLE TRIP LEVEL
- INCREASED VISIBILITY THROUGH HIGH INTENSITY LED OR OPTIONAL XENON FLASH UNIT
- EASY-TO-INSTALL
- UV-STABILIZED POLYCARBONATE HOUSING



MAIN CHARACTERISTICS

Catalog Number	Reference Number	Ground fault sensitivity	Light signalling reset	Indication	
Cabletroll 2500	J208641	Fixed levels of 40, 80, 120 A or continuously adjustable from 5-120 A	1/ Timer reset temporisation (off, 2, 4, 8, 16 or 32 hours 2/ 15 seconds after a successful repowering	A pair of relay contacts (N. O.) 120 V DC/ 1A gives a 1-second impulse	LED and (or optional Xénon flash unit

Cabletroll 2500 fault detectors have been designed for use outdoors or in sheltered areas.

Normal operating conditions:
- Ambient temperature from – 40°C to + 70°C
- Lithium battery lifetime: 10 years for LED application at 20°C ambient or 2,500 hour operation.
- Weight: 750 g

Cabletroll 2500

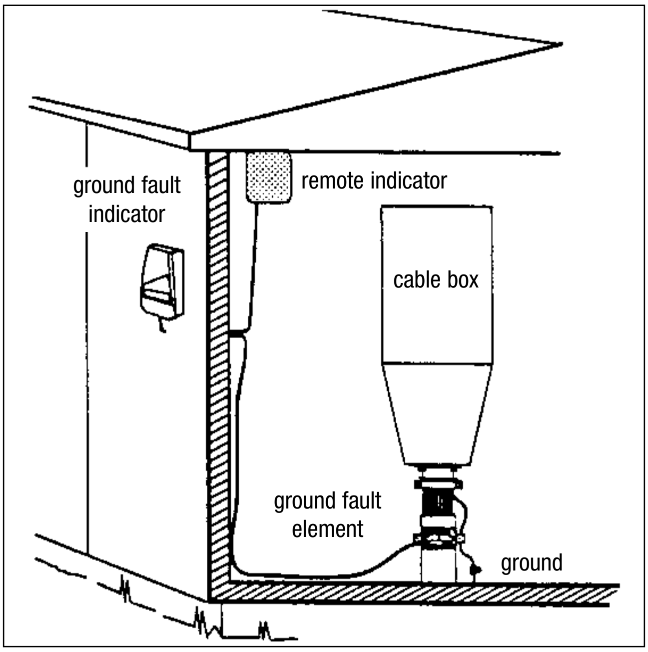
Overview

Cabletroll 2500 is a ground fault sensing system. It consists of a **Ground Fault Element and Ground Fault Indicator.** It can be mounted in high voltage underground cable distribution networks with system voltage from 6 to 36 kV.

The sealed Ground Fault Element mounts on most widely used cable types, while the weatherproof indicator is well suited for outdoor mounting (See fig. 1).

The indicator is fitted with a high intensity LED for local indication and an optional Xenon flash unit. It is also equipped with a pair of relay contacts for connection to remote indicators, which communicate via cable and/or radio.

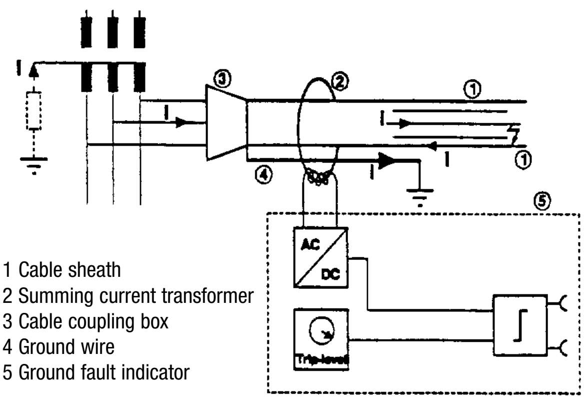
The trip level for ground fault can be set on-site to fixed values of 40A, 80A or 120A. It is factory set to 40A. In addition, the trip level can be continuously adjusted in the ranges 5-40A, 8-80A or 12-120A.



CABLETROLL 2500

Functional description

Ground faults in general
In networks with directly earthed zero-point, a ground fault is equivalent to a phase-to-ground short circuit. In that case the current magnitude will be somewhat less than in the case of a phase-to-phase short circuit. For networks that do not have directly earthed zero-point, the magnitude of the singular ground fault current is ruled by the size of the galvanically interconnected network, voltage level, type of cable and the zero-point equipment.
Ground Fault Element
The Ground Fault Element is a summing current transformer (CT) which generates a current when the vectorial sum of the 3 phase currents becomes different from zero, i.e. during ground fault. With no ground fault, the vectorial sum is approximately zero.

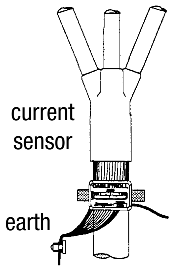


1 Cable sheath
2 Summing current transformer
3 Cable coupling box
4 Ground wire
5 Ground fault indicator

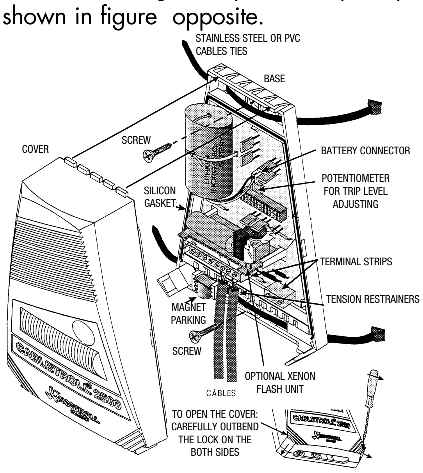
Ground fault sensor principle

Mounting

Ground Fault Element
The element connects to the indicator via its ready-mounted cable (2.0 m).
Multi-core cable: The element is mounted on the screened part of the cable, below the stripback point, according to the mounting instructions. The screen is turned back underneath the flexible CT-core and terminated at the ground point. The principle is shown in figure opposite.



Ground Fault Element:
Screen turnback



Mounting of Ground Fault Indicator

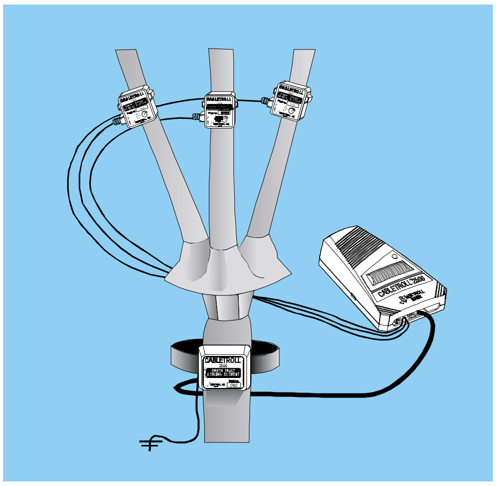
Ground Fault Indicator
The Indicator should be mounted in a readily visible location. It can be mounted on a pole or a wall with the two enclosed self-threading screws. The Indicator is also suited for mounting with stainless steel or PVC cable ties. Both options are illustrated in figure above. Remove the front cover of the indicator to access holes for screws/ties. See figure for further details.

Fault Indicators

Cabletroll 2700

Save time and money!
Let CABLETROLL 2700 track down your faulty sections and save you the guess work and time involved in traditional methods of switching during faults

- MICROCONTROLLER BASED INDICATOR
- PROGRAMMABLE FUNCTION IN SOFTWARE
- SEPARATE INDICATION OF GROUND FAULT AND SHORT CIRCUIT FAULTS
- INDICATION OF PHASE AND FAULT TYPE
- REMOTE SIGNALING OUTPUTS
- MULTIPLE POWER SUPPLY ALTERNATIVES
- MULTI-RESET FUNCTION: MANUALLY, PROGRAMMABLE, TIMER, REMOTE AND BY VOLTAGE RETURN
- RESPONSE TIME ADAPTABLE TO RELAY PROTECTION



SYSTEM DESCRIPTION

Cabletroll 2700 is a complete system for indication of earth-fault and short circuit faults in an underground 6-36V cable network.
The system consist of three different modules:

- Ground fault element with a split core for sensing the imbalance during ground faults
- 2 (or3) sensors for detecting short-circuits
- Processing unit including power supply and indication unit with flashing LED's for local indication and relay contacts for remote signalling, controlled by a microcontroller.

Trip level for ground fault is continuously adjustable within the range of 5-240A. Short circuit trip level is adjustable within the range of 300-1000A.

The system has separate indicators for ground fault and short-circuit faults.
Three LED's show which phases are involved in the short circuit.

For remote signaling, two pairs of relay contacts are available; ground fault and short circuit.

OPERATING MODE

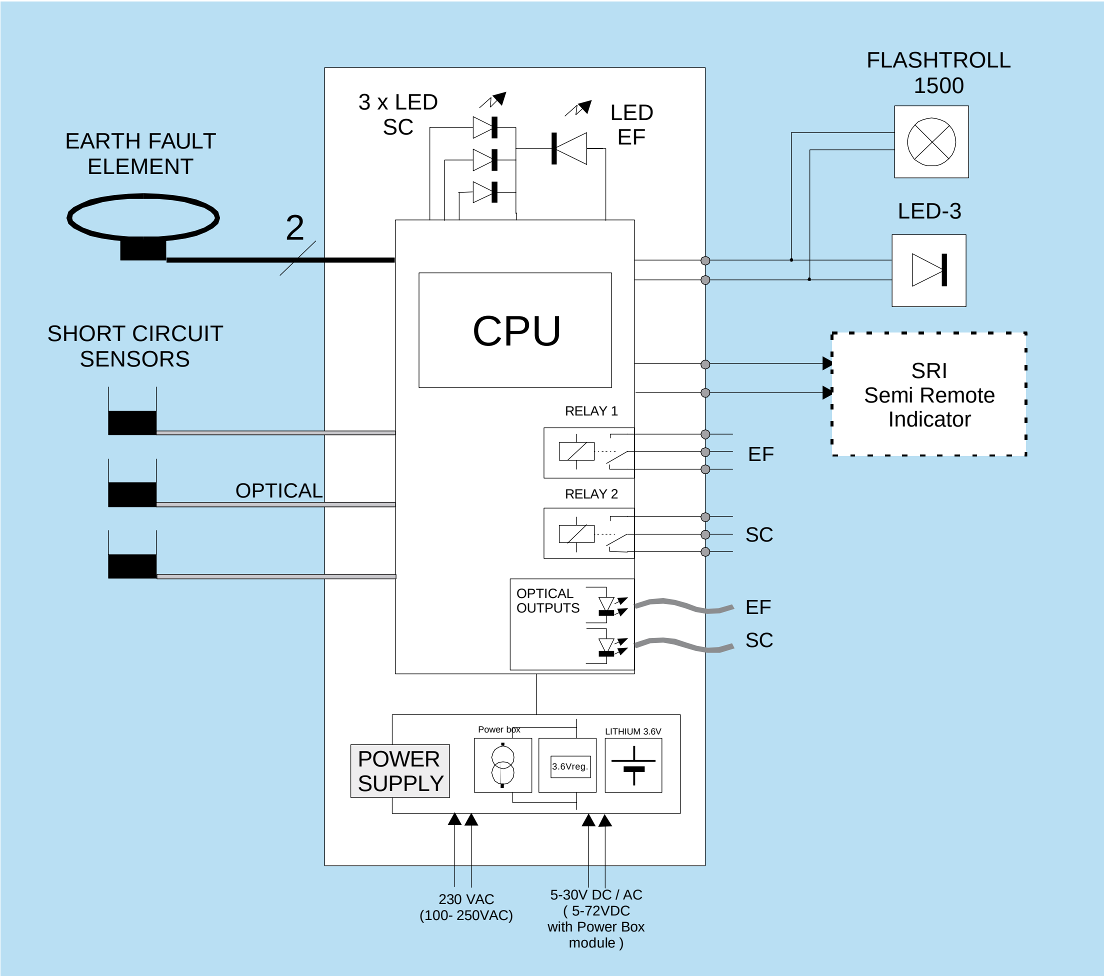
Functions are controlled by a microprocessor and all time delays and operation of the indication unit are programmed in software, making it very easy to adapt to different requirements.

Different operating modes are available:

- Immediate indication of both permanent and transient faults
- Immediate local and remote indication of both permanent and transient faults causing circuit breaker tripping
- Postponed operation of relay contacts, allowing closing-cycles to finish before remote-indication is activated Indication of permanent faults only
- Both timer and voltage reset can be enabled or disabled independently

Fault Indicators

Cabletroll 2700



TECHNICAL SPECIFICATIONS

Trip levels:

- **Ground fault:** 40, 80,105, 120, 1601 210 and 240A (fixed levels) or continuously adjustable from 5-240A.
- **Short Circuit:** Adjustable in the range 300 1000 A

Response time:

- Independant adjustable time delays for ground fault and short circuit faults.

Indication:

- Visual by 4 internal LED's
- External LED / Xenon flash (optional)
- Outputs for remote indication

Inputs:

- Ground Fault Element
- 3 x Short-Circuit Element (AMP fiber optic connector)
- External power 230V AC
- External 5-30 (72V) DC/AC -power
- External reset

Outputs:

- LED-3 / FlashTroll 1500 (for indication outside the kiosk by LED or Xenon-flash)
- Relay 1: Volt free NO / NC for ground fault indication
- Relay 2: Volt free NO / NC for short-circuit indication
- Signal output to communication module
- Optical output (AMP) ground fault indication (Optional)
- Optical output (AMP) for short-circuit indication (Optional)

Fault Indicators

Cabletroll 2700

Test/reset:
- Magnet contacts for activating test/reset without opening housing.
- Internal push-button for test/reset.
- Remote reset (closed contact)
- External reset 230V AC
- Reset from internal timer: 2, 4, 8, 12, 16, 24 and 32 hours.

Power supply alternatives:
- Internal lithium battery
- Internal sealed lead rechargable battery (giving 50 hrs back-up)
- External 230 VAC
- External 5 - 30 V DC / AC
- By using a Power Box-DC/DC-converter, external power can be in the range of 5-72 V DC/ AC, and the CT 2700 will be galvanic insulated from power source.

Power consumption:

Surveillance mode: < 50 µA (minimum 7 years operation with Lithium-battery providing 2hrs activation 10 times year).

Alarm mode: < 50 mA depending on external indication.

Temperature range: -40 / +70 deg.

Function:
Function can easily be adpated to different conditions by setting parameters in software, such as response time, reset timing, operation of relays etc.

Basic modes:

Mode 0: Immediate local and remote indication. Voltage reset enabled. Timer reset disabled. Indication of both permanent and transient fault.

Mode 1: Immediate local and remote indication. Voltage reset disabled. Timer reset enabled. Indication of both permanent and transient fault.

Mode 2: Immediate local and remote indication Voltage reset enabled. Timer reset enabled. Indication of both permanent and transient fault causing circuit breaker tripping.

Mode 3: Postponed operation of relay contacts, allowing reclosing-cycles to finish before remote-indication is activated. Reset functions as for Mode 2. Indication of permanent faults only.

Battery change: Every 2500 hours of indication, normally every 7 years.

EMC: The indicator is designed according to current EMC-standards for immunity and emission.

Cabletroll 3600



DETECTEUR DIRECTIONNEL
DE DEFAUT
POUR RESEAUX SOUTERRAINS

Présentation

Les détecteurs directionnels de défaut type CABLETROLL 3600 sont à installer sur les réseaux HTA souterrains pour aider l'exploitant à localiser les défauts. Ils détectent les défauts monophasés et polyphasés des réseaux à neutre compensé ou impédant 300A. Ils utilisent une nouvelle technique de détection qui apporte des avantages majeurs sur la technique classique des détecteurs actuels basée sur des seuils de courant. Cette nouvelle technologie lui permet de fonctionner sur les réseaux à fort courant capacitif (réseaux mixtes aéro - souterrains avec forte proportion de câble, réseaux souterrains de grande longueur) contrairement aux détecteurs conventionnels.

Le détecteur CABLETROLL 3600 est capable de différencier les défauts polyphasés des défauts monophasés phase - terre et d'indiquer dans ce dernier cas la direction du défaut.

Ils sont utilisables sur des réseaux de 6 à 36 kV pour les applications suivantes :

LDAC CABLETROLL 3600 LDAC : installé sur des points stratégiques du réseau (points de manoeuvre, en tête de grappe ou en tronçon d'artère), il fournit à l'exploitant une aide à la conduite en indiquant par une signalisation lumineuse le passage d'un courant de défaut monophasé ou polyphasé.

LDAC BT CABLETROLL 3600 LDAC BT : associé à un organe de manoeuvre télécommandé type ACM ou ACT, il fournit à l'exploitant une aide à la télé conduite par la mise à la disposition de contacts informant le système de télé conduite du passage d'un courant de défaut monophasé ou polyphasé.

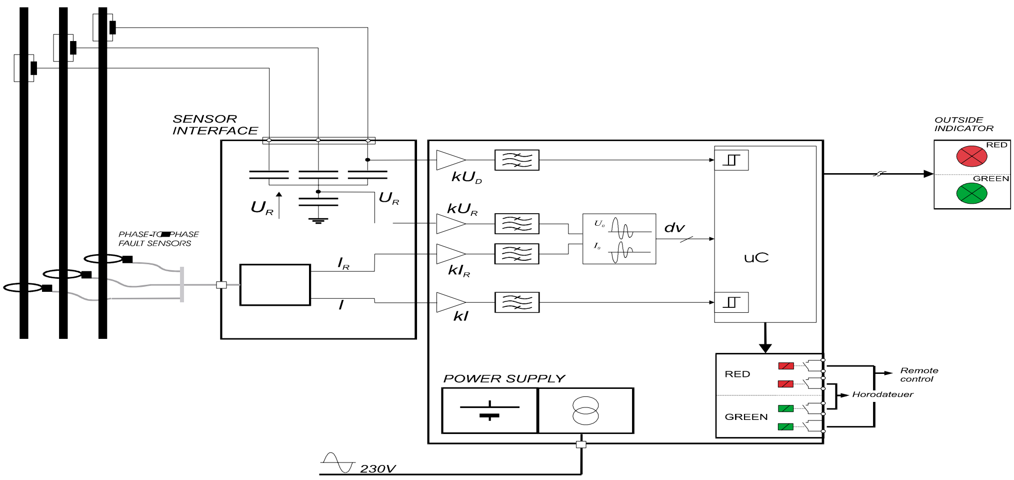
LDAU CABLETROLL 3600 LDAU : installé pour une période limitée sur des réseaux perturbés il permet d'identifier les tronçons responsables de défauts, il fournit à un horodateur les informations nécessaires à l'analyse des défauts permanents et non permanents.

Cabletroll 3600

Description et principe de fonctionnement

Le fonctionnement du CABLETROLL 3600 est basé sur le principe de détection directionnel et défaut décrit dans le brevet EDF N°9209549.

Le diagramme fonctionnel ci-dessous reprend les principaux circuits du détecteur CABLETROLL 3600.



Durant les premières millisecondes qui suivent un défaut monophasé, des transitoires de tension et de courant sont créés sur le réseau. En interprétant le déphasage entre la tension résiduelle et le courant résiduel, par l'intermédiaire d'un microprocesseur, le circuit est capable de dire dans quelle direction est situé le défaut monophasé (Amont ou Aval des tores de mesure de courant du détecteur).
Pour les défauts polyphasés, le principe de fonctionnement est ampèremétrique (seuil de courant).

Ils existent en 6 versions standards :

Fonction	Alimentation	Liaisons extérieures	Désignation	Référence
Aide à la conduite autonome	Piles (4ans d'autonomie)	NON	CABLETROLL 3600 LDAC	S 210765 A
Aide à la conduite autonome avec compteur nécessité de télécommande COMTROLL 3600 W 210768 A	Piles (4ans d'autonomie)	NON	CABLETROLL 3600 LDAC compteur	W 210998 A
Aide à la conduite avec alimentation BT	230 VAC	mise à disposition de contacts extérieurs images de la signalisation visuelle	CABLETROLL 3600 LDAC BT	T 210766 A
Aide à la conduite avec alimentation BT avec compteur nécessité de télécommande COMTROLL 3600 W 210768 A	230 VAC	mise à disposition de contacts extérieurs images de la signalisation visuelle	CABLETROLL 3600 LDAC BT compteur	X 210999 A
D'auscultation autonome nécessité de télécommande COMTROLL 3600 W 210768 A	Piles (4ans d'autonomie)	Mise à disposition d'une liaison horodateur	CABLETROLL 3600 LDAU	Y 211000 A
D'auscultation avec alimentation BT nécessité de télécommande COMTROLL 3600 W 210768 A	230 VAC	Mise à disposition d'une liaison horodateur	CABLETROLL 3600 LDAU BT	V 210767 A

Cabletroll 3600

Application des détecteurs CABLETROLL 3600

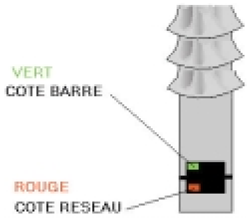
Généralité

Quand un CABLETROLL 3600 détecte un courant de défaut, il fournit l'information par une signalisation lumineuse ou par l'intermédiaire de contacts (CABLETROLL 3600 AC BT ou AU).
Dès que la détection du défaut est validée, le détecteur CABLETROLL 3600 allume son boîtier de signalisation qui restera en action jusqu'à un des événements suivants :

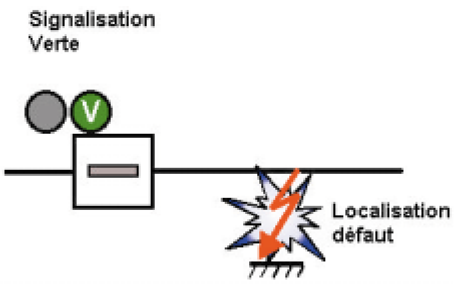
- Retour de la tension direct sur la ligne HTA
- Fin de la temporisation interne de 2 heures
- Mise en veille du détecteur par l'opérateur au moyen du dispositif “manuel” du boîtier ou par l'intermédiaire de la télécommande de infrarouge COMTROLL. La mise en veille manuelle se fait par une rotation du capot inférieur jusqu'à la position RAZ “voyant” et retour à la position initiale.

Détection des défauts monophasés

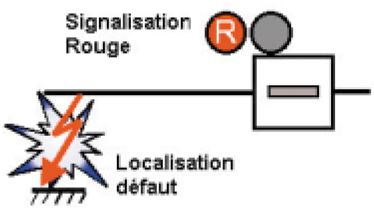
Le principe de détection directionnel consiste à indiquer dans le cadre des défauts monophasés la partie du réseau en défaut. Pour cela chaque tore comporte un repère VERT et un repère ROUGE. Les tores doivent être impérativement montés de telle manière que le repère VERT soit du côté BARRE et le repère ROUGE du côté RESEAU.



Si le détecteur allume la signalisation VERTE le défaut se trouve côté VERT donc COTE BARRE.

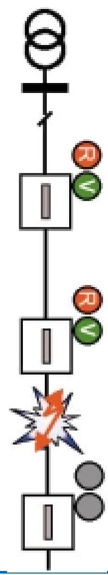


Si le détecteur allume la signalisation ROUGE le défaut se trouve côté ROUGE donc COTE RESEAU.



Détection des défauts polyphasés

Dans ce cas le détecteur CABLETROLL 3600 fonctionne comme les détecteurs d'ancienne génération, il n'y a plus de directionnalité. Tous les détecteurs montés entre le poste source et le défaut vont allumer alternativement la signalisation verte et la signalisation ROUGE (1 fois / seconde)



Cabletroll 3600

Caractéristiques de détection

Défauts monophasés
Tout défaut monophasé caractérisés par un courant résiduel supérieur à 60A crête ± 10A et une tension résiduelle à 9 kV crête ± 2 kV est pris en compte.
La détection du défaut après le franchissement des seuils est validée par la présence 40 ms plus tard d'une tension résiduelle Vr supérieure à 3,5 kV ± 0,5 kV.

Défauts monophasés doubles
Un défaut considéré "monophasé double" est constitué d'un défaut simultané entre deux phases différentes d'un réseau alimenté par un même transformateur HTB/HTA et la terre sur des terres différentes éloignés géographiquement. Les deux défauts peuvent se situer sur le même départ ou sur deux départs différents.Dans ce cas tout défaut caractérisé par un courant résiduel supérieur à 250 Aeff ± 50A est pris en compte.

Défauts polyphasés
Tout défaut polyphasé caractérisé par un courant supérieur à 450 Aeff ± 80A est pris en compte

Caractéristique de retour de tension directe
La prise en compte du retour de la tension directe HTA (RAZ de la signalisation) se fait à partir de 10 kVeff ± 2 kV

Constitution du détecteur

Le détecteur CABLETROLL 3600 est constitué de 6 parties :

- Mesure de tension : sous-ensemble constitué d'un connecteur mâle PP (voir schéma des liaisons) de type WAGO Réf 723-604/000-042 raccordé à un câble de longueur 7 ou 12 m en option. Ce câble est à raccorder sur le bornier du boîtier principal du détecteur. Le connecteur mâle est à connecter sur la partie femelle (non fournie avec le détecteur) qui doit relier aux prises de potentiel amovible pour connecteur séparable (PPACS non fournie avec le détecteur).

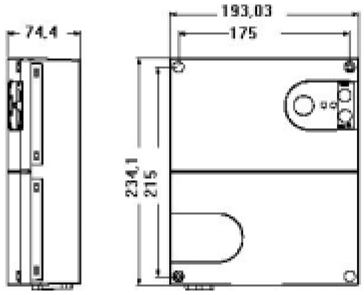
- Mesure de courant :sous-ensemble constitué de 3 capteurs de courant comprenant chacun un élément de détection avec son câble et un collier de fixation du capteur sur les câbles HTA. Les trois câbles sortant des capteurs sont munis d'un connecteur TC (voir schéma des liaisons) à raccorder au câble pour capteur de courant (voir ci-après).

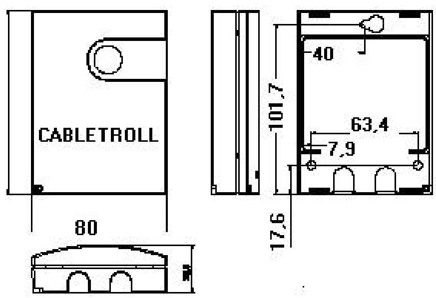
- Câble pour capteurs de courant:

  câbles de longueur 7 ou 12 m en option reliés à un connecteur. Ce câble est à raccorder d'un côté par l'intermédiaire des connecteurs TC aux capteurs de courant et de l'autre sur le bornier du boîtier principal du détecteur.

- Câble 4 conducteurs de longueur 7 ou 12 m en option pour la liaison entre le boîtier de signalisation et le boîtier principal

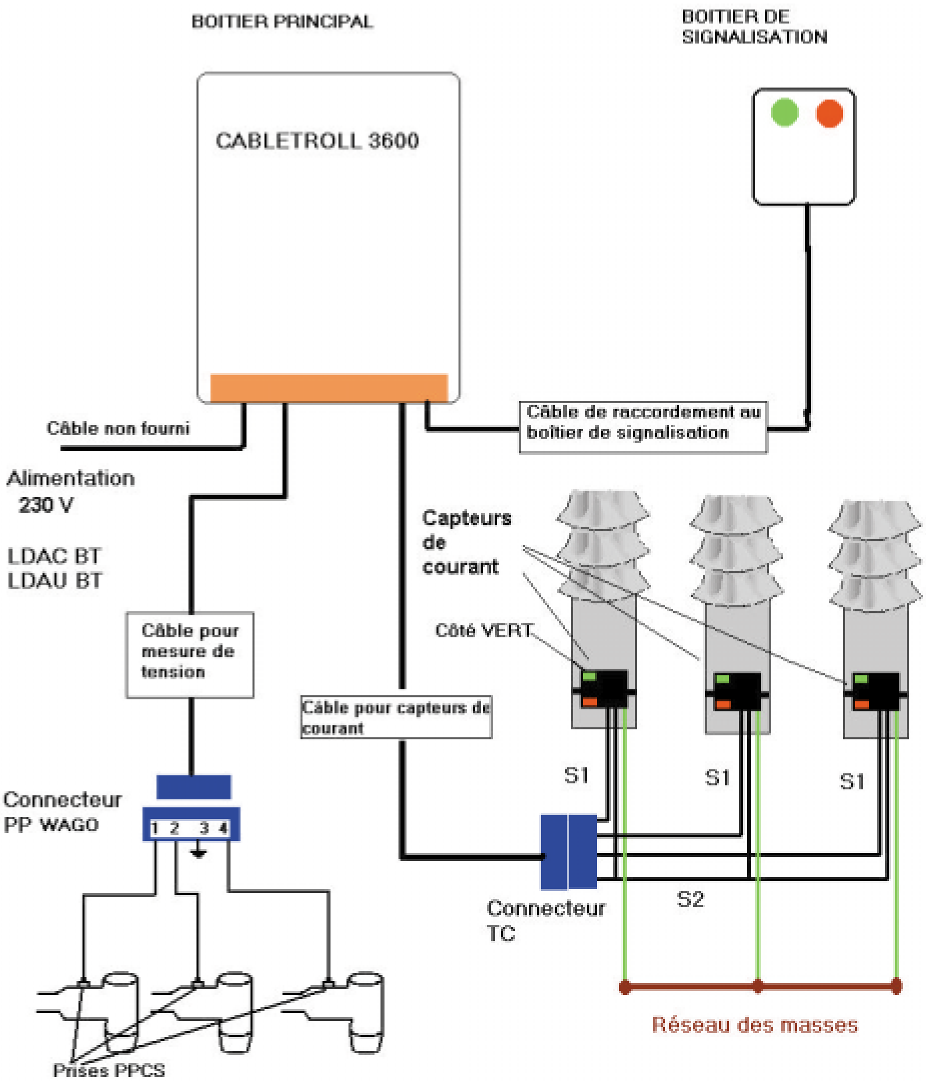
- Boîtier principal comprenant : la carte électronique, l'alimentation, les boutons de TEST et RAZ et les borniers de raccordement aux éléments extérieurs.





- Boîtier de signalisation constitué d'un boîtier résistant aux chocs et aux intempéries contenant les signalisations lumineuses Vertes et Rouges. Ce boîtier doit être installé à l'extérieur du poste ou de l'armoire.

Cabletroll 3600



Fault Indicators

Linetroll 111K

POLE-MOUNTED FAULT INDICATORS

- FAULT SENSING IN FAULTY SECTIONS OF OVERHEAD NETWORKS
- OUTDOOR USE FOR 6 TO 66 KV NETWORKS
- PROGRAMMABLE AND FITTED TO ANY CONFIGURATION
- EASY-TO-INSTALL
- INCREASED VISIBILITY THROUGH XENON FLASH INDICATION



MAIN CHARACTERISTICS

Catalog Number	Reference Number	Maximum sensitivity		Recommended distance between link and indicator	Indication	
		Ground fault	Short-circuit fault		Permanent fault	Transient fault
Linetroll 111K	Z208126	ISET 4A Adjustable on 7 15 or 50 A	ISC > 2 times I load line	3 to 5 m	Programmable Xenon Flash 1,5 - 12 H	LED Diode Storage up to 24 h

Linetroll 111K indicators are designed for outdoor installation.

Normal operating conditions:
- Ambient temperature between – 40°C and + 70°C
- Lithium battery lifespan: 5 to 10 years depending on ambient temperature or every 500 hours of operations
- Weight: 750 g

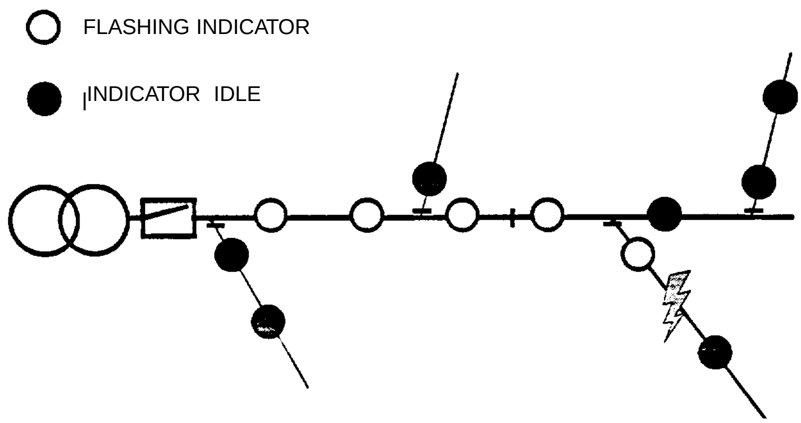
Fault Indicators

Linetroll 111K

Overview

Linetroll 111K indicators are used to locate short-circuit and earth faults in overhead power distribution networks. Linetroll 111K is a 3-phase unit fully covering the different types of potential fault configurations.

Indicators are placed at strategic locations along the line, such as after branching points and sectionalisers.
The indicator may be pole-mounted, 3-5 meters below the conductors, by means of screws or wrapping-bands.
Live line mounting is done safely, easily and rapidly.

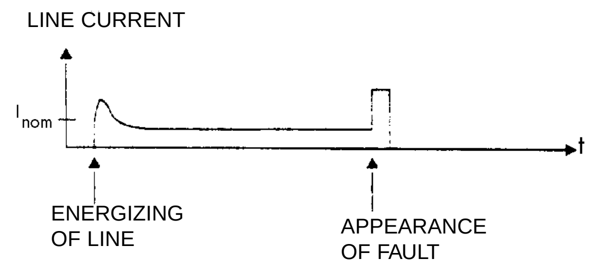


Upon detection of a line fault, the indicator gives off an intermittant Xenon gas flash. This flash can be seen at up to 200 - 300 metres distance in full daylight and 2 - 3 km at night. The indicator lens allows for uniform 360 degree monitoring. Upon fault sensing, all indicators installed between the feeding substation and the fault will operate. Indicators place behind the fault remain idle.

Functional description

Linetroll 111Ks fault sensing is based on detection of the electromagnetic field below the conductors.
The unit is fully self-contained; no external transformers or connections of any kind is required.
To determine whether or not the line is faulted, the indicator looks for a specific sequence in the line conditions before it starts flashing. The general sequence is as follows.
1. The line should be energized for at least 3 seconds.
2. The line current should increase rapidly above the value set by the user (the nominal trip level).
3. The line should be de-energized.

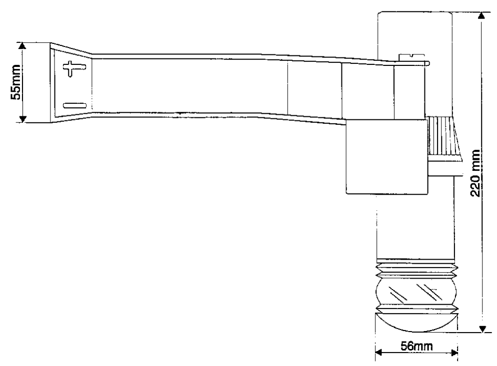
However, the user may program the operating criteria to suit local requirements by manipulating a bank of microswitches inside the indicator.

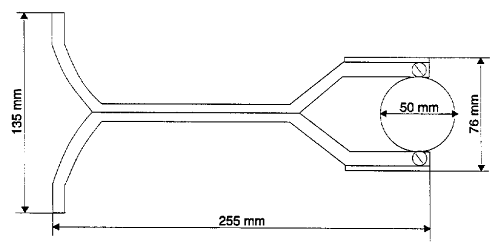




Mounting

Linetroll 111K mounts with screws (included) or wrapping bands. This enables installation on either wood or concrete poles.





Linetroll 3500

DIRECTIONAL FAULT CURRENT
INDICATOR FOR OVERHEAD LINES

Presentation



LINETROLL® 3500 is a pole-mounted intelligent Fault Current Indicator (FCI) for use in electrical power networks. It uses brand-new detection technology that provides major benefits over previous FCI technology. LT3500 aims at tracking down the fault site rather than monitoring the exact fault current level.

FCIs contribute to improving the quality of supply in electrical distribution networks by providing instant information about fault sites. Based on this information, power rerouting and repair work can commence quickly. Outage duration and the use of manpower for fault-searching can be reduced by as much as 75%, a substantial saving potential for any utility.

For Distribution Automation (DA) purposes, or in combination with remote-controlled switchgear, FCIs used as information sources represent a good alternative to automatic reclosers and sectionalisers. Reconnection of faulted lines as well as disconnection of healthy lines is avoided. Wear and tear of personnel and equipment is reduced.

Strategic application (large numbers) of FCIs represents an important tool in the search for optimum electrical energy supply quality and price. For any utility, the use of FCIs translates to increased earnings and improved goodwill and credibility among customers.

LINETROLL® 3500 is designed for application on 1- or 3-phase overhead distribution lines at voltages from 6-132 kV. It is able to discriminate between phase-to-phase (PTP) faults and phase-to-ground (PTG) faults and offers directional capabilities on PTG faults, pointing towards the fault site.

LT 3500 represents a breakthrough in FCI performance and is applicable in networks of any neutral earthing method. The basic version of the unit exhibits 1 out of 2 available factory default characteristics, exclusively tailored for service in the following types of network: solid earthing versus impedance earthing or isolated networks.

It is designed to flawlessly meet the challenges of networks that undergo extensions and/or modifications, power re-routing and heavy load variations. All of this without the need for time-consuming network capacitance and fault current magnitude calculations, saving a lot of expensive time. The trick is that, contrary to earlier fault indicator generations, LT3500's performance remains uninfluenced by capacitive discharge currents when applied in isolated or impedance earthed networks.

Unmatched application flexibility and product lifetime is achieved through modular hardware design and software upgradeability.

Several methods of fault detection can be utilised simultaneously, offering many possibilities for adapting the function of the unit to some of the protection relay characteristics.

Maintenance requirements are very low thanks to sophisticated power management and a selection of power supply packs of adequate capacity.

Linetroll 3500

APPLICATION OF LINETROLL® 3500

When LT3500 detects a fault current, it will indicate this by flashing lights or by other means (optional). The unit is able to discriminate between PTG and PTP faults on any kind of network with regard to the earthing method in use.

The fault indicator light will keep flashing until a predetermined automatic reset condition is fulfilled. Such an automatic reset condition can be the return of voltage to the line (voltage reset), time lapsed since fault occurred (timer reset) or other.

Manual reset can be carried out on-site by rotating the display unit to the RESET position, either by hand or by use of a special TEST/RESET TOOL. The test/reset tool must be used when the indicator cannot be reached from the ground.

Performance in coil- (Petersen), coil+ resistor-, resistor earthed networks and isolated networks.

PTG faults

All LT3500s mounted in the network supplied from the same feeder will indicate, flashing a single-color light, red or green. The color determines the relative direction to the fault site.

When approaching the front of the indicator, i.e. when you see the indicator in front of the pole:

a) if the indication color is red; turn back along the line, the fault site is in the opposite direction

b) if the indication color is green; continue forward along the line, the fault site lies ahead

PTP faults

LT3500s mounted along the fault current path be-tween the feeder and the fault site will indicate, flashing alternating red and green lights.

Bi-colored alternating indication means that a PTP fault has occurred downstream from the indicator.

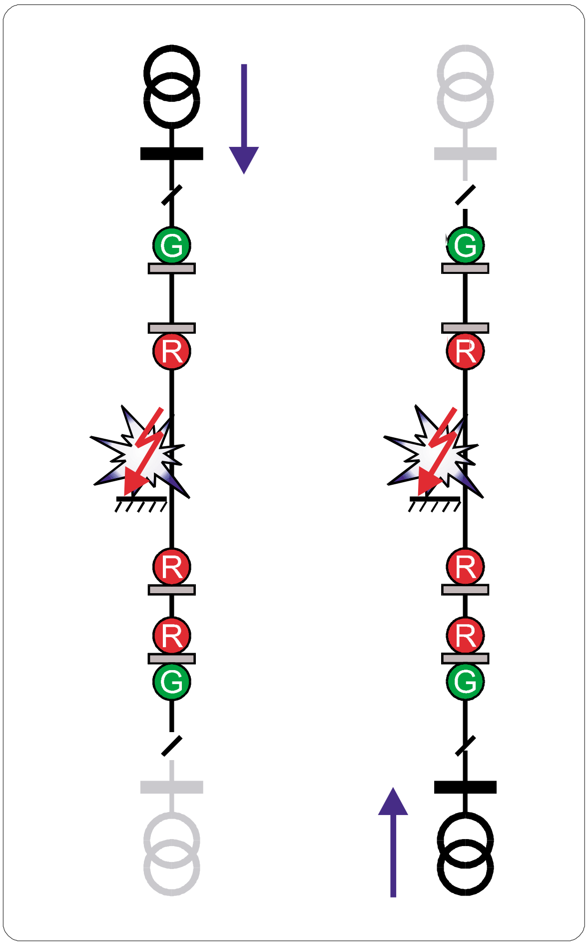


Figure 0-1. LT3500 delivers directional performance on PTG faults. Different feeding directions do not affect the indication pattern.

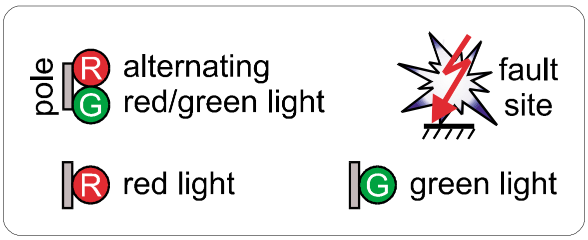


Figure 0-2. How to interpret network diagrams: Bird's eye view of pole with indicator, indication alternatives and fault site(s).

Fault Indicators

Linetroll 3500

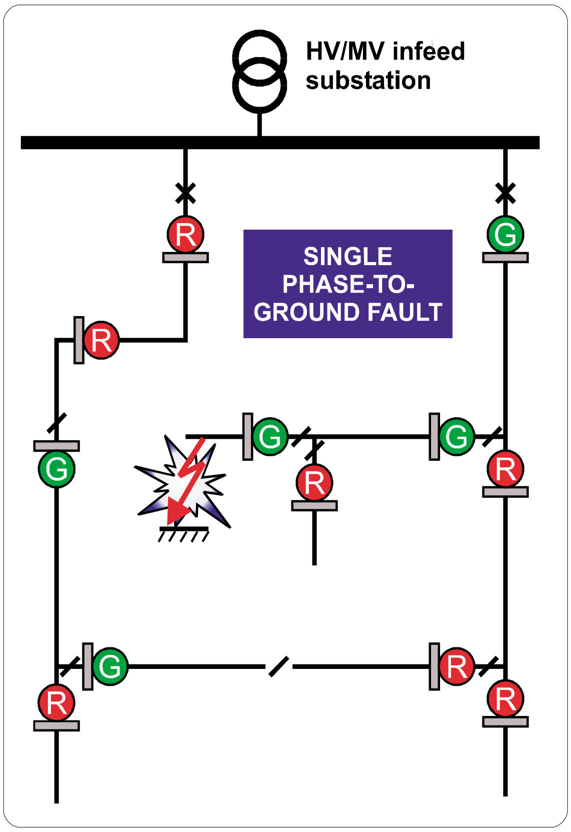


Figure 0-3. Single PTG fault results in uncomplicated indication pattern and fault site tracking.

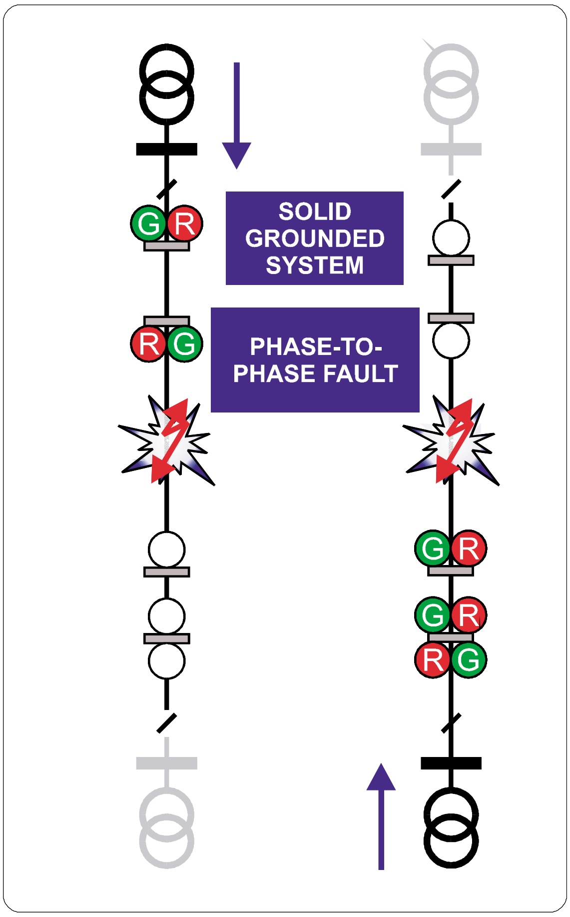


Figure 0-4. LT3500 performance on PTP faults. Different feeding directions give different indication patterns.

Performance in solid earthed networks

PTG faults and PTP faults are indicated equally.

The criteria for detection and indication of PTG and PTP faults can be programmed individually, comprising a combination of di/dt and overcurrent techniques.

Only LT3500s mounted along a fault current path between a feeder and the fault site will indicate by flashing lights.

Inversely, a fault site should be located downstream from a flashing FCI. More precisely, the fault site should be located between the last flashing FCI and the first idle FCI.

Linetroll 3500

Operation

LT3500 is the result of several years of research, development and testing aimed at setting new standards for reliability and functionality of FCIs.

A few hints
The unit continuously monitors the electromagnetic field on site. It looks for particular sequences of field changes to take place. Upon recognition of such a sequence, the unit samples and stores information in memory for immediate analysis. Based on analysis, the unit either indicates a faulted line or resumes trivial surveillance.
The exact sensitivity to fault current magnitude is not critical for correct operation.

Fault category display
Phase-to-Ground and Phase-to-Phase faults can be indicated individually, as can transient faults versus permanent faults. For on-site monitoring, faults are indicated by flashing lamps in the display unit. The flashing pattern defines what kind of fault the unit has detected. The display unit can be rotated horizontally to allow easy monitoring from any position.

Directionality
A great advantage to LT3500 is its directional capability. In impedance earthed or isolated networks the unit is able to tell its relative position to a phase-to-ground fault site.

Maintenance
Maintenance of FCIs normally involves replacing the batteries. A range of battery packs is available for LT3500, allowing some flexibility with respect to service intervals.

Optional extras

IR programming unit

RTU interface and/or
external power supply connector card

Solar power pack

VHF radio + solar power pack

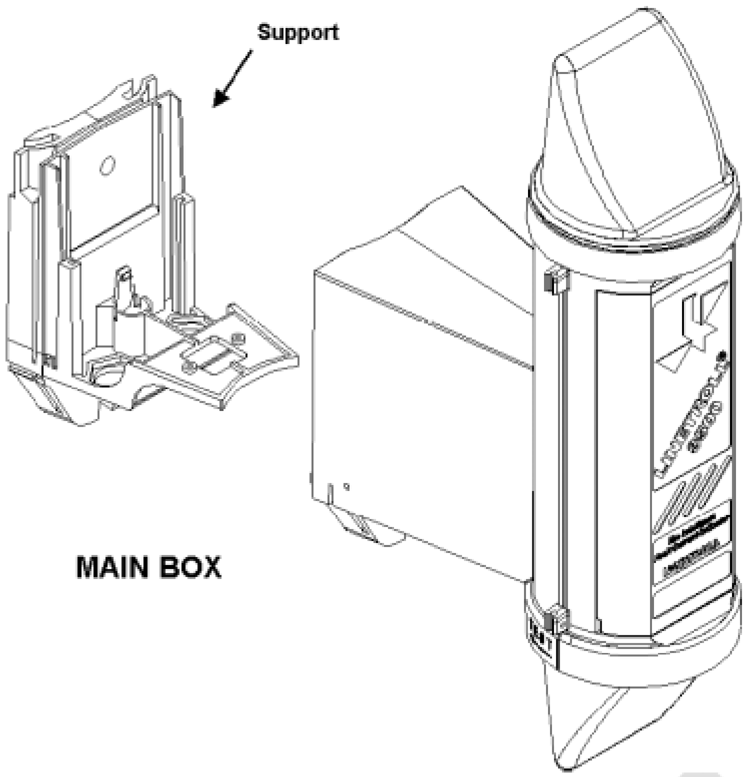
UHF radio + solar power pack

Xenon display unit

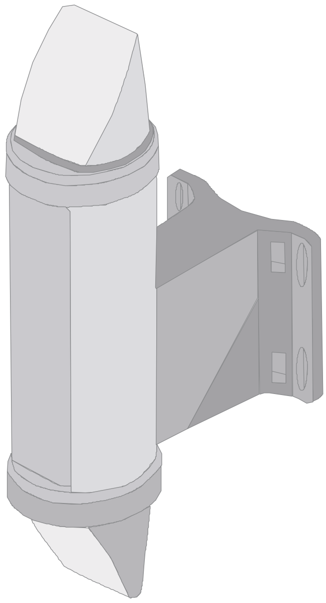
Test/reset tool

Battery packs

Mounting



Linetroll 3600



DETECTEUR DIRECTIONNEL
DE DEFAUT
POUR RESEAUX AERIENS

Présentation

Les détecteurs directionnels de défaut type LINETROLL 3600 sont à installer sur les réseaux HTA aériens pour aider l'exploitant à localiser les défauts. Ils détectent les défauts monophasés et polyphasés des réseaux à neutre compensé ou impédant 300A. Ils utilisent une nouvelle technique de détection qui apporte des avantages majeurs sur la technique classique des détecteurs actuels basée sur des seuils de courant. Cette nouvelle technologie lui permet de fonctionner sur les réseaux à fort courant capacitif (réseaux mixtes aéro - souterrains avec forte proportion de câble) contrairement aux détecteurs conventionnels.

Le détecteur LINETROLL 3600 est capable de différencier les défauts polyphasés des défauts monophasés phase - terre. et d'indiquer dans ce dernier cas la direction du défaut.

Ils sont utilisables sur des réseaux de 6 à 132 kV. pour les applications suivantes :

LINETROLL 3600 PDAC : installé sur des points stratégiques du réseau (points de manoeuvre, support en tête de grappe ou en tronçon d'artère, il fournit à l'exploitant une aide à la conduite en indiquant par une signalisation lumineuse le passage d'un courant de défaut monophasé ou polyphasé.

LINETROLL 3600 PDAT : associé à un organe de manoeuvre télécommandé type IAT, il fournit à l'exploitant une aide à la télé conduite par la mise à la disposition de contacts informant le système de télé conduite du passage d'un courant de défaut monophasé ou polyphasé.

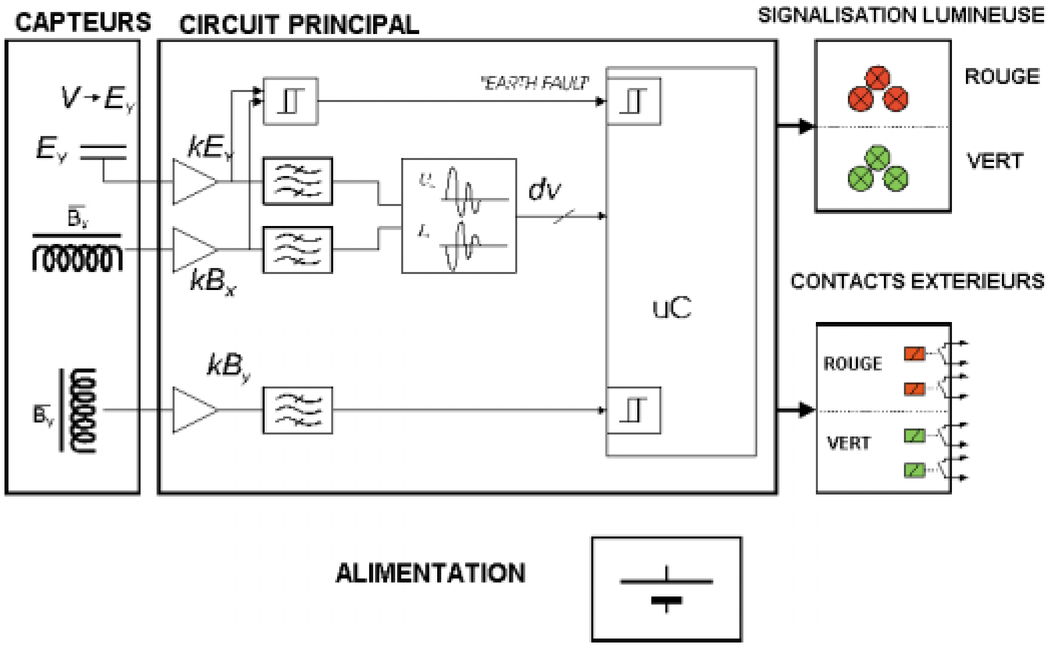
LINETROLL 3600 PDAU : installé pour une période limitée sur des réseaux perturbés il permet d'identifier les tronçons responsables de défauts, il fournit à un horodateur les informations nécessaires à l'analyse des défauts permanents et non permanents.

Linetroll 3600

DESCRIPTION ET PRINCIPE DE FONCTIONNEMENT

Le fonctionnement du LINETROLL 3600 est basé sur le principe de détection directionnel et défaut décrit dans le brevet EDF N°9209549.

Le diagramme fonctionnel ci-dessous reprend les principaux circuits du détecteur LINETROLL 3600.



Durant les premières millisecondes qui suivent un défaut monophasé, des transitoires de tension et de courant sont créés sur le réseau. En interprétant le déphasage entre la tension résiduelle et le courant résiduel, par l'intermédiaire d'un microprocesseur, le circuit est capable de dire dans quelle direction est situé le défaut monophasé (Amont ou Aval du support sur lequel est installé le détecteur).
Pour les défauts polyphasés, le principe de fonctionnement est ampèremétrique (seuil de courant).

Ils existent en 5 versions standards :

Fonction	Alimentation	Liaisons extérieures	Désignation	Référence
Aide à la conduite	Piles (4ans d'autonomie)	NON	LINETROLL 3600 PDAC	P 210762 A
Aide à la conduite avec compteur. Nécessité de télécommande COMTROLL 3600 W 210768 A	Piles (4ans d'autonomie)	NON	LINETROLL 3600 PDAC compteur	V 210997 A
Aide à la téléconduite	12 VDC	mise à disposition de contacts extérieurs images de la signalisation visuelle	LINETROLL 3600 PDAT	Q 210763 A
Aide à la téléconduite avec compteur Nécessité de télécommande COMTROLL 3600 W 210768 A	12 VDC	mise à disposition de contacts extérieurs images de la signalisation visuelle	LINETROLL 3600 PDAT compteur	T 210996 A
D'auscultation Nécessité de télécommande COMTROLL 3600 W 210768 A	Piles (4ans d'autonomie)	Mise à disposition d'une liaison horodateur	LINETROLL 3600 PDAU	R 210764 A

Linetroll 3600

APPLICATION DES DETECTEURS LINETROLL 3600

Généralité

Quand un LINETROLL 3600 détecte un courant de défaut, il fournit l'information par une signalisation lumineuse ou par l'intermédiaire de contacts (LINETROLL 3600 AT ou AU).
Dès que la détection du défaut est validée, le détecteur LINETROLL 3600 allume son boîtier de signalisation qui restera en action jusqu'à un des événements suivants :

· Retour de la tension direct sur la ligne HTA
· Fin de la temporisation interne de 2 heures
· Mise en veille du détecteur par l'opérateur au moyen du dispositif " manuel " du boîtier ou par l'intermédiaire de la télécommande de infrarouge COMTROLL. La mise en veille manuelle se fait par une rotation du capot inférieur jusqu'à la position RAZ " voyant " et retour à la position initiale.

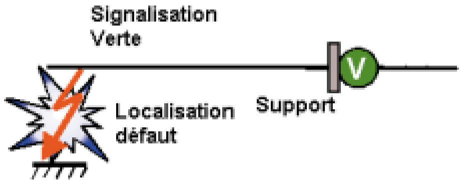
Détection des défauts monophasés

Le principe de détection directionnel consiste à indiquer dans le cadre des défauts monophasés la partie de ligne en défaut.

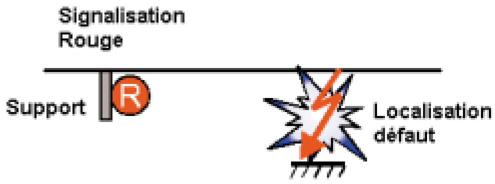
Pour cela le boîtier du détecteur LINTROLL 3600 définit deux repères :

· Un repère Rouge sur l'avant du boîtier
· Un repère Vert situé sur l'arrière côté support.

Si le détecteur allume la signalisation VERTE le défaut se trouve côté VERT donc côté support.

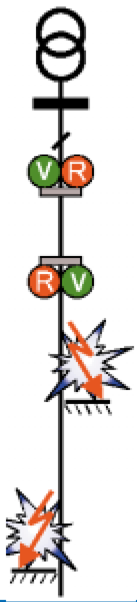


Si le détecteur allume la signalisation ROUGE le défaut se trouve côté ROUGE donc à l'opposé du support.



Détection des défauts polyphasés

Dans ce cas le détecteur LINETROLL 3600 fonctionne comme les détecteurs d'ancienne génération, il n'y a plus de directionnalité. Tous les détecteurs montés entre le poste source et le défaut vont allumer alternativement la signalisation verte et la signalisation ROUGE (1 fois / seconde)



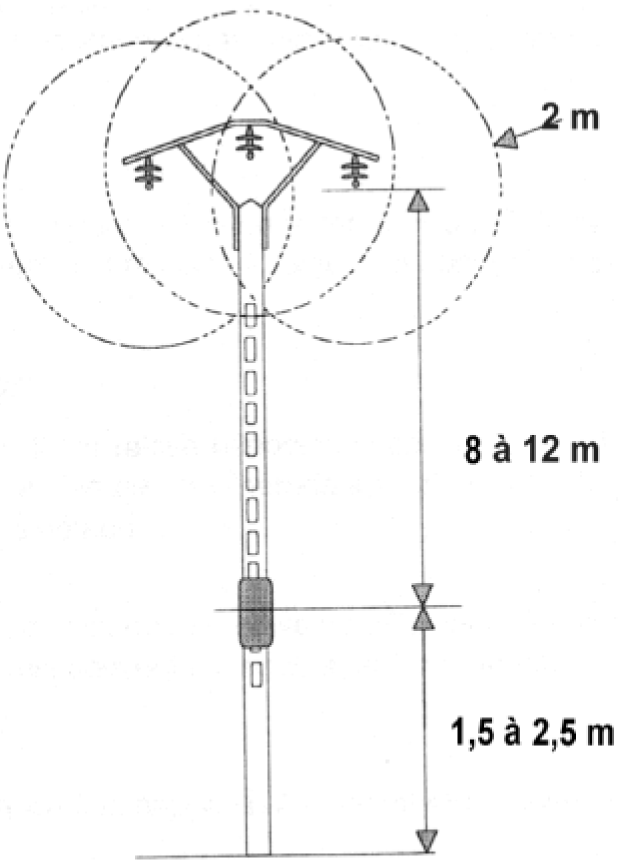
Fault Indicators

Linetroll 3600

Caractéristiques de détection

Les sensibilités sont définies dans la configuration de référence ci-dessous. Pour tout autre configuration nous consulter.

Défauts monophasés
Tout défaut monophasé caractérisés par un courant résiduel supérieur à 60A crête + 10A et une tension résiduelle à 9 kV crête + 2 kV est pris en compte.
La détection du défaut après le franchissement des seuils est validée par la présence 40 ms plus tard d'une tension résiduelle Vr supérieure à 3,5 kV + 0,5 kV.



Défauts polyphasés
Tout défaut polyphasé caractérisé par un courant supérieur à 450 Aeff + 80A est pris en compte

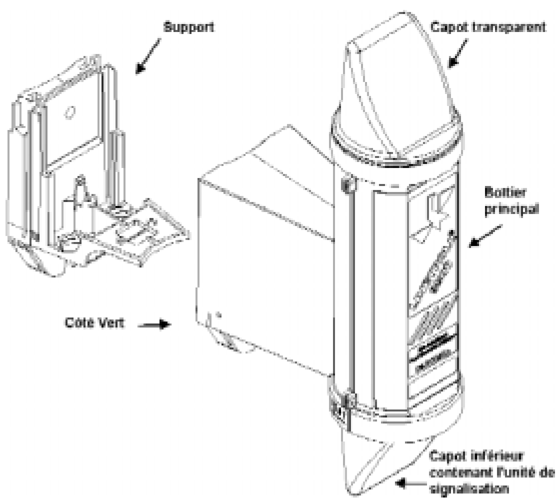
Défauts monophasés doubles
Un défaut considéré " monophasé double " est constitué d'un défaut simultané entre deux phases différentes d'un réseau alimenté par un même transformateur HTB/HTA et la terre sur des terres différentes éloignés géographiquement. Les deux défauts peuvent se situer sur le même départ ou sur deux départs différents.Dans ce cas tout défaut caractérisé par un courant résiduel supérieur à 250 Aeff + 50A est pris en compte.

Caractéristique de retour de tension directe
La prise en compte du retour de la tension directe HTA (RAZ de la signalisation) se fait à partir de 10 kVeff + 2 kV

Constitution du détecteur

Le détecteur LINETROLL 3600 est constitué de quatre parties :

- Un support à fixer sur le poteau par feuillard métallique. Ce support comprend éventuellement le passage des câbles de liaison vers d'autres équipement et le connecteur pour l'horodateur.
- Un boîtier principal comprenant : les capteurs, les cartes électroniques, l'alimentation.
- L'unité de signalisation située sur le bas du boîtier. Cette unité de signalisation peut-être tournée à 90° pour améliorer la visualisation en cas de besoin. Elle est aussi utilisée pour la remise à zéro et le test du détecteur.
- Un capot supérieur vissé sur le boîtier principal. Ce capot peut comporter en option un panneau solaire pour l'alimentation du détecteur.



Lightning Arresters

AZB LINE
3 TO 42 kV
10 kA-CLASS 1

- ZINC OXIDE VARISTOR-BASED ARRESTERS
- SILICON ELASTOMER HOUSING
- IEC ZONE III-CLASS OUTDOOR USE
- HIGH-CAPACITY ENERGY ABSORPTION
- OPTIONAL END-OF-LIFE INDICATOR
- OPTIONAL DISCONNECTOR
- IN ACCORDANCE WITH IEC 99-4 STANDARD



ELECTRICAL RATINGS

AZB type ref.	Voltage rating Ur (kV)	Continuous operating voltage Uc (kV)	Residual voltage Ures (kV)							Temporary * overvoltage capability for 10 s (kV)
			1/4 µs wave	8/20 µs wave					30/80 µs wave	
			@ 10 kA	@ 2.5 kA	@ 5 kA	@ 10 kA	@ 20 kA	@ 40 kA	@ 500 A	
030	3	2.55	12.0	9.0	9.5	10.5	12.0	14.2	8.1	3.4
040	4	3.4	15.8	10.4	11.0	11.7	14.0	15.7	8.8	4.5
060	6	5.1	23.5	17.9	19.0	20.5	24.1	27.2	15.6	6
090	9	7.6	35.0	26.4	28.0	30.5	35.6	40.2	23.2	10
100	10	8.4	35.0	26.4	28.0	30.5	35.6	40.2	23.2	11
120	12	10.2	46.5	33.9	35.9	39.3	45.7	51.6	30.7	13.5
150	15	12.7	58.0	42.6	45.1	49.5	57.4	64.9	38.3	16.5
180	18	15.3	69.5	50.4	53.3	58.7	68.0	76.8	45.9	20
190	19	16.1	69.5	50.4	53.3	58.7	68.0	76.8	45.9	21
210	21	17.5	69.5	50.4	53.3	63	68.0	76.8	45.9	22.5
240	24	19.5	81.0	60.4	64.0	70.5	81.6	92.2	53.4	25.5
270	27	22	92.5	68.9	73.0	80.5	93.1	105.2	61.0	29
300	30	24.4	104.0	77.4	82.0	90	104.6	118.2	68.5	32
330	33	27	115.5	85.9	91.0	100	116.1	131.2	76.1	35.5
360	36	29	127.0	94.4	100.0	110.5	127.6	144.2	83.7	38
390	39	32	138.5	102.9	109.0	120.5	139.1	157.2	91.2	42
420	42	34	138.5	102.9	109.0	120.5	139.1	157.2	91.2	45

* After preconditioning of two 100 kA shocks

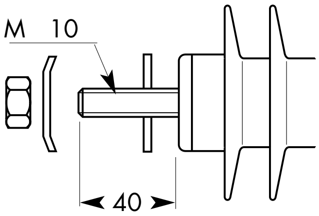
MAIN CHARACTERISTICS

AZB lightning arresters are high-voltage distribution arresters.The stack of ZnO varistors is initially pressurized thanks to metallic discs which give it the necessary flexibility to operate under stress. These arresters have characteristics in accordance with the IEC 99-4 standard dated 91/11.

Rated discharge current :	10 kA
Maximum high-current impulse (4/10 µs wave)	100 kA
Operating frequency:	48 to 62 Hz
Short-circuit fault current withstand ratings:	20 kA / 0.2 s
Extreme operating temperatures:	- 40° c to 60° c
Maximum cantilever strength:	- 250 N.m
Maximum torque:	- 50 N.m
Energy absorption capacity: (High current impulse)	3.7 kJ / kV of voltage rating

TERMINAL CONNECTIONS

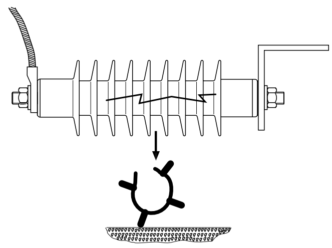
Each 10 mm diameter stud is threaded 40 mm long. (25 mm for the disconnector connection) and fitted with one nut, one washer and a reversible cable grip washer. All metallic arrester parts in contact with conductors are stainless steel.



OPTIONAL END-OF-LIFE INDICATOR

AZB arresters are available with optional end-of-life indicator.
It is set out between two fins. Its sensibility rating is 150 A*.
When the arrester fails, the power arc generated on the ZnO varistor surface is switched over outside without silicone housing fragmentation.

During arc creeping, the black ring is sectioned then ejected to the ground by means of slots made in the internal structure of the arrester.



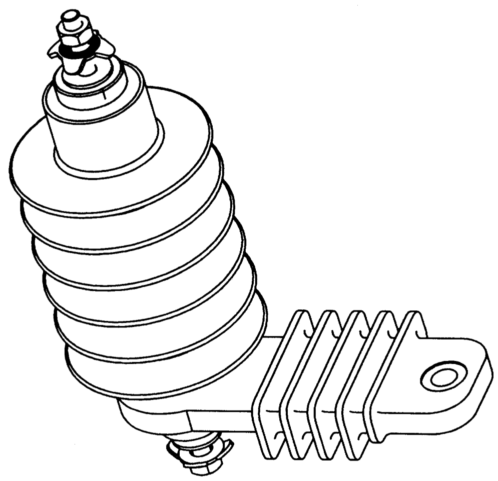
*Optional indicator with 15 A sensitivity available

REFERENCES

Voltage rating Ur (kV)	Without end-of-life indicator type		With end-of-life indicator type		Weight (kg)	Packaging
	AZB type reference	Ref. Number	AZB type reference	Ref. Number		
3	AZB 030	V210261	AZB 031	H210273	1.2	x 1
4	AZB 040	W210262	AZB 041	J210274	1.3	x 1
6	AZB 060	X210263	AZB 061	K210275	1.3	x 1
9	AZB 090	Y210264	AZB 091	L210276	1.36	x 1
10	AZB 100	Z210265	AZB 101	M210277	1.5	x 1
12	AZB 120	A210266	AZB 121	N210278	1.5	x 1
15	AZB 150	B210267	AZB 151	P210279	1.8	x 1
18	AZB 180	C210268	AZB 181	Q210280	2.1	x 1
19	AZB 190	M210369	AZB 191	Q210372	2.1	x 1
21	AZB 210	D210269	AZB 211	R210281	2.1	x 1
24	AZB 240	E210270	AZB 241	S210282	2.2	x 1
27	AZB 270	F210271	AZB 271	T210283	2.7	x 1
30	AZB 300	G210272	AZB 301	V210284	3	x 1
33	AZB 330	N210370	AZB 331	R210373	3.1	x 1
36	AZB 360	Q210303	AZB 361	W210285	3.2	x 1
39	AZB 390	N210301	AZB 391	X210286	3.3	x 1
42	AZB 420	P210371	AZB 421	S210374	4.7	x 1
For further information see next page	Mounting bracket	Reference #	Mounting bracket	Reference #	Weight (kg)	Packaging
	EZX 1	F206798	EZX 1	F206798	0.2	x 9
	EZX 2	G206799	EZX 2	G206799	0.250	x 9
	EZX 3	H206800	EZX 3	H206800	0.3	x 9

OPTIONAL GROUND LEAD DISCONNECTOR AND INSULATING BRACKET

AZB arresters are available with optional disconnector and insulating bracket. When the arrester fails, for instance after a heavy direct lightning stroke, the disconnector removes the ground terminal from the arrester to prevent a permanent line fault and provide a visual indication of the arrester end-of-life. In case of disconnector operation, there is no further protection until replacement of the damaged arrester.



REFERENCE NUMBERS

With disconnector type		Weight (kg)	Packaging
AZB type reference	Ref. Number		
AZB 032	Y210287	1.6	x 1
AZB 042	Z210288	1.7	x 1
AZB 062	A210289	1.7	x 1
AZB 092	B210290	1.75	x 1
AZB 102	C210291	1.75	x 1
AZB 122	D210292	2	x 1
AZB 152	E210293	2.3	x 1
AZB 182	F210294	2.6	x 1
AZB 192	T210375	2.6	x 1
AZB 212	G210295	2.6	x 1
AZB 242	H210296	2.7	x 1
AZB 272	J210297	2.9	x 1
AZB 302	K210298	3.5	x 1
AZB 332	V210376	3.6	x 1
AZB 362	L210299	3.7	x 1
AZB 392	M210300	3.8	x 1
AZB 422	W210377	5.2	x 1

MOUNTING GUIDE

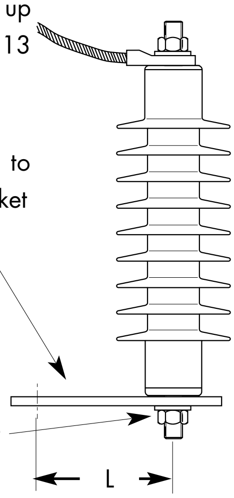
AZB arresters are invariably mounted by one of the 10 mm diameter threaded terminals. They can be installed either vertically or horizontally as well as any intermediate position.

VERTICAL-TYPE INSTALLATION

Connection to line with aluminium or copper cables from 25 mm² up to 148 mm² (with or without 13 mm diameter socket)

Mounting bracket adapted to insulated NEMA crossarm bracket

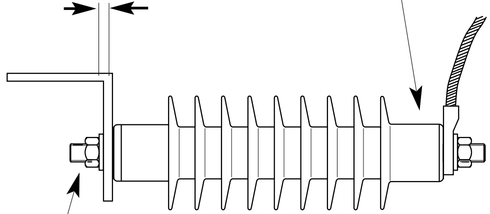
Mouting bracket	L (mm)
EZX 1	100
EZX 2	150
EZX 3	210



A ground conductor can be inserted between two bottom nuts

HORIZONTAL-TYPE INSTALLATION

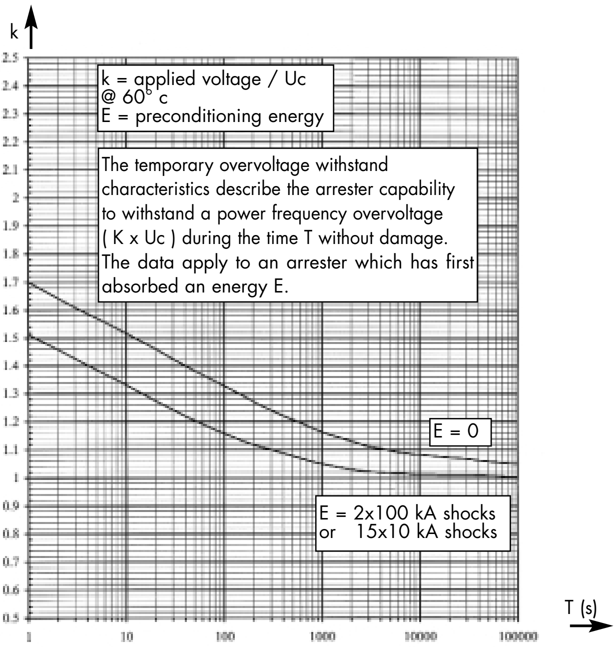
Connection to line with aluminium or copper cables from 25 mm² up to 148 mm² (with or without 13 mm diameter socket)



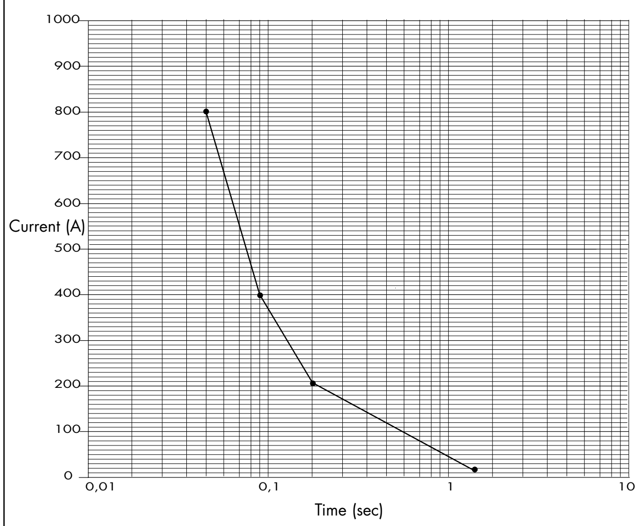
A ground conductor can be inserted between two bottom nuts

PROTECTIVE CHARACTERISTICS

TEMPORARY OVERVOLTAGE WITHSTAND CHARACTERISTICS

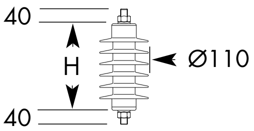


DISCONNECTOR CURRENT-TIME CHARACTERISTIC OPERATING CURVE

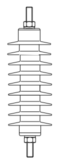


PHYSICAL CHARACTERISTICS

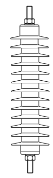
The polymer housing of AZB arresters enables them to be used in high-density industrial IEC zones (zone III - class).
Optional longer creepage housing can be provided.



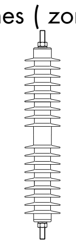
AZB 030/040/060
AZB 090/100/120/150



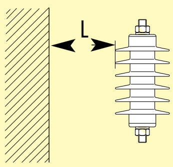
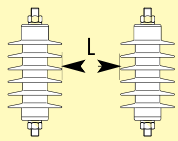
AZB 180/190/210
AZB 240/270



AZB 300/330
AZB 360/390



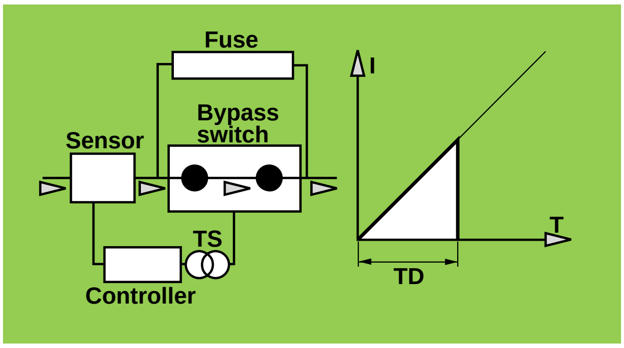
AZB 420

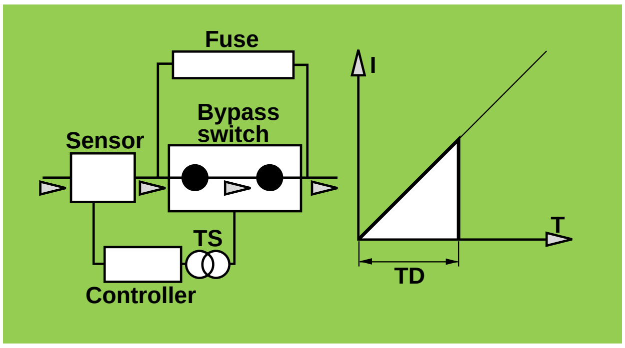
AZB type reference	Length H (mm)	Nominal creepage (mm)	Housing dielectric withstand		Insulation distance between arresters (mm)	
			Lightning shock withstand rating (kV)	50 Hz-1mn withstand rating (kV)	 L	 L
AZB 030/031/032	181	480	52	32	100	140
AZB 040/041/042	188	480	52	32	100	140
AZB 060/061/062	188	480	52	32	100	140
AZB 090/091/092	180	480	52	32	130	180
AZB 100/101/102	180	480	52	32	130	180
AZB 120/121/122	188	480	52	32	180	220
AZB 150/151/152	211	500	65	42	180	220
AZB 180/181/182	262	740	92	52	240	280
AZB 190/191/192	262	740	92	52	240	280
AZB 210/211/212	262	740	92	52	240	280
AZB 240/241/242	271	740	92	52	300	340
AZB 270/271/272	293	760	105	55	300	340
AZB 300/301/302	365	1030	143	70	300	340
AZB 330/331/332	371	1040	144	75	330	410
AZB 360/361/362	379	1040	144	75	330	410
AZB 390/391/392	385	1045	157	75	390	480
AZB 420/421/422	524	1465	164	104	390	480

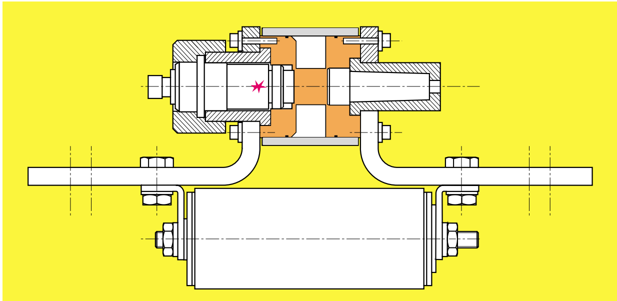
Current Limiting Systems

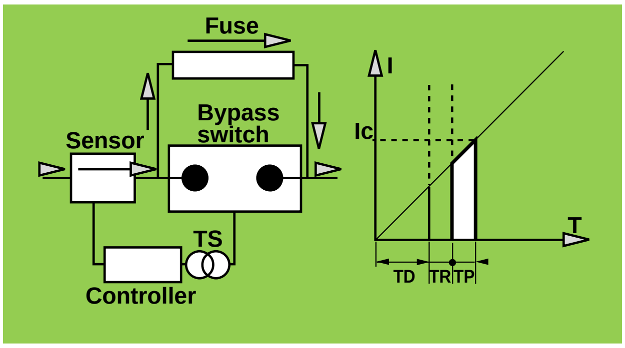
Ultra high-speed current limiting systems meet needs for protection in static converters as well as medium voltage distribution equipment, providing protection of distribution systems in plants when available short-circuit power has been increased and exceeds rating of existing installations.

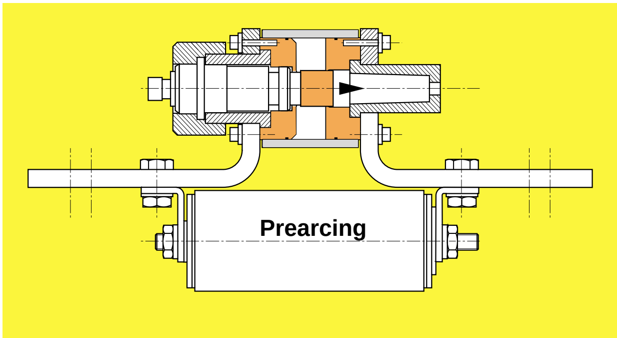
Use of Pyristor© systems as back-up protection for under-rated breakers is an economical circuit protection solution for high-power equipment in industrial electric power generation and distribution systems.

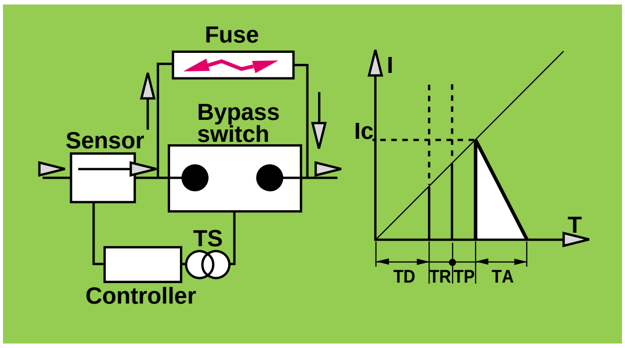


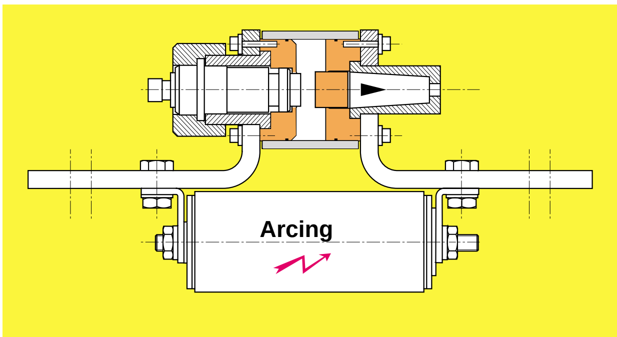


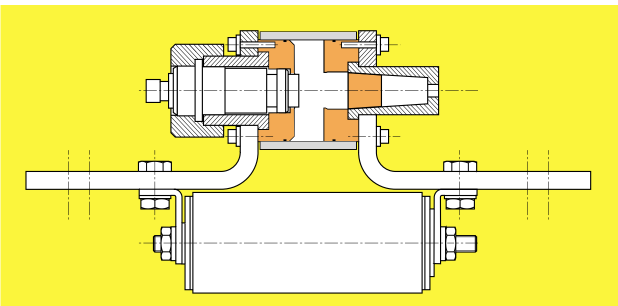

Explosion - Shearing of the copper rod

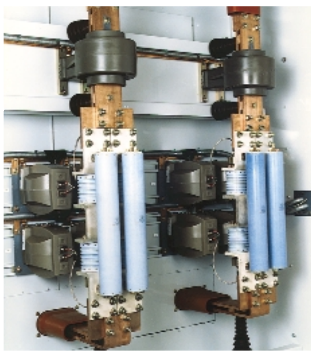









Circuit completely open



Ferraz Shawmut

Special Purpose Fuses

North American

Cable Protectors



Welder Protectors



Form 600



Plug Fuses



Surge Suppression Fuses



Forklift Fuses



Telecommunications Fuses



European

Residential Fuses



Surge Suppression Fuses



Rotating Fuses



Special Purpose Fuses

North American

Cable Protectors

CP & CPH



CABLE PROTECTORS

Ferraz Shawmut CP Cable Protectors are special purpose limiters which are crimped or bolted to cables to clear and isolate faults quickly, increasing the reliability of service entrance and distribution runs. They are current limiting with a 200,000A interrupting rating, yet will carry low cable overloads which are handled by standard protective devices. Cable Protectors are rated in terms of cable size and material (Al or Cu). Heavier duty CPH Cable Protectors are available on special order. Heat shrinkable (HS) tubing can be specified for field installation. For cables smaller than 4/0, Class J fuses can be used. Refer to the Application Information Section for more information.

Features / Benefits

- ✔ **Fiberglass bodies** for dimensional stability in harsh environments
- ✔ **Catalog number stamped** into terminal for permanent identification
- ✔ **Crimp terminals** for aluminum cable include oxide inhibitor
- ✔ **Molded rubber boots** or heat shrinkable tubing available for insulation and protection

Reference Numbers

DESCRIPTION			COPPER		ALUMINIUM	
TYPE	TERMINATION	CABLE SIZE	CAT. N°	REF. N°	CAT. N°	REF. N°
1	CABLE TO CABLE	2	CP2C1	E217814	-	-
		1/0	CP1/0C1	B200883	-	-
		2/0	CP2/0C1	A201940	-	-
		4/0	CP4/0C1	Y214243	CP4/0A1	N212716
		250kcmil	CP250C1	X213230	CP250A1	R211684
		350kcmil	CP350C1	W223096	CP350A1	C218847
		500kcmil	CP500C1	D200885	CP500A1	D218848
		750kcmil	CP750C1	M216280	CP750A1	A212198
3	CABLE TO OFFSET BUS	2	CP2C3	Q218330	-	-
		1/0	CP1/0C3	N201423	-	-
		2/0	CP2/0C3	Y211161	-	-
		4/0	CP4/0C3	E215261	CP4/0A3	Y213231
		250kcmil	CP250C3	X214242	CP250A3	X212195
		350kcmil	CP350C3	P201424	CP350A3	R219366
		400kcmil	CP400C3	R218331	-	-
		500kcmil	CP400C3	R218331	CP500A3	S219367
		750kcmil	CP750C3	D217307	CP750A3	A214245
5	STRAIGHT BUS TO OFFSET BUS	4/0	CP4/0C5	K216278	CP4/0C5	K216278
		250kcmil	CP250C5	Z214750	CP250C5	Z214750
		350kcmil	CP350C5	Z211162	CP350C5	Z211162
		500kcmil	CP500C5	Z214244	CP500C5	Z214244
		750kcmil	CP750C5	T218333	CP750C5	T218333
6	MOLE TO CABLE	4/0	CP4/0C6	B217305	CP4/0A6	P213729
		250kcmil	CP250C6	E215767	CP250A6	M212715
		350kcmil	CP350C6	S211685	CP350A6	E222575
		500kcmil	CP500C6	F215262	CP500A6	F222576
		750kcmil	CP750C6	F218850	CP750A6	G215769
8	MOLE TO OFFSET BUS	4/0	CP4/0C8	F217815	CP4/0C8	F217815
		250kcmil	CP250C8	K216784	CP250C8	K216784
		350kcmil	CP350C8	Y212196	CP350C8	Y212196
		500kcmil	CP500C8	L216279	CP500C8	L216279
		750kcmil	CP750C8	V219369	CP750C8	V219369

* kcmil = MCM

Ratings

- ✔ Sizes #2 to 750kcmil copper
  4/0 to 750kcmil aluminum
  600VAC, 200kA I.R.

Approvals

- ✔ Ferraz Shawmut Certified

Catalog Numbering System

CP 500 C 3

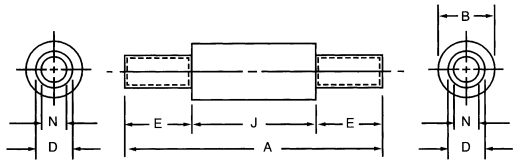
- Standard Duty **CP** / Heavy Duty **CPH**
- Conductor Size
- Cable Material: Copper **C** / Aluminum **A**
- Termination Type

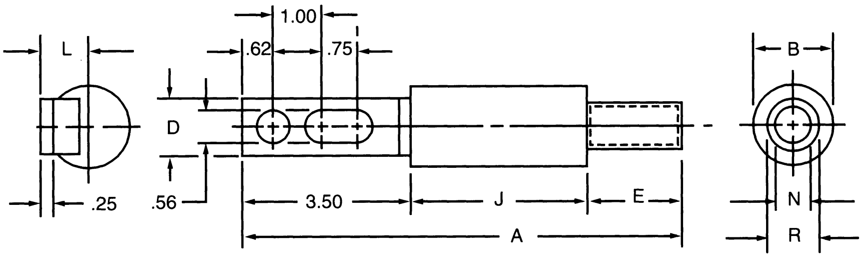
Cable Protectors

CP & CPH

Type C1 – Dimensions

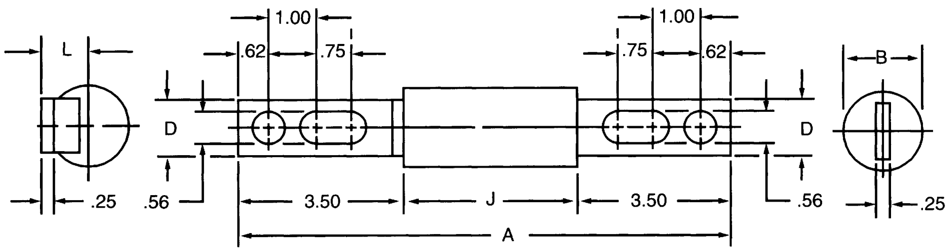
CATALOG NUMBER	RFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm) A	B	D	E	J	N
CP2C1	E217814	#2	7.12 (180)	1.44 (37)	.42 (11)	1.75 (44)	3.62 (92)	.31 (7.9)
CP1/0C1	B200883	1/0	7.12 (180)	1.44 (37)	.52 (13)	1.75 (44)	3.62 (92)	.39 (9.9)
CP2/0C1	A201940	2/0	7.12 (180)	1.44 (37)	.56 (14)	1.75 (44)	3.62 (92)	.44 (11)
CP4/0C1	Y214243	4/0	7.12 (180)	1.44 (37)	.68 (17)	1.75 (44)	3.62 (92)	.55 (14)
CP250C1	X213230	250kcmil	7.38 (188)	1.44 (37)	.75 (19)	1.88 (48)	3.62 (92)	.62 (16)
CP350C1	W223096	350kcmil	7.62 (194)	1.62 (41)	.88 (22)	2.00 (51)	3.62 (92)	.71 (18)
CP500C1	D200885	500kcmil	9.38 (238)	1.88 (48)	1.05 (27)	2.88 (73)	3.62 (92)	.85 (22)
CP750C1	M216280	750kcmil	9.51 (242)	2.50 (64)	1.32 (34)	2.88 (73)	3.75 (95)	1.06 (27)





Type C3 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm) A	B	D	E	J	L	N	R
CP2C3	Q218330	#2	8.87 (225)	1.44 (37)	1.12 (28)	1.75 (44)	3.62 (92)	.96 (24)	.31 (7.9)	.42 (11)
CP1/0C3	N201423	1/0	8.87 (225)	1.44 (37)	1.12 (28)	1.75 (44)	3.62 (92)	.96 (24)	.39 (9.9)	.52 (13)
CP2/0C3	Y211161	2/0	8.87 (225)	1.44 (37)	1.12 (28)	1.75 (44)	3.62 (92)	.96 (24)	.44 (11)	.56 (14)
CP4/0C3	E215261	4/0	8.87 (225)	1.44 (37)	1.12 (28)	1.75 (44)	3.62 (92)	.96 (24)	.55 (14)	.68 (17)
CP250C3	X214242	250kcmil	9.00 (229)	1.44 (37)	1.12 (28)	1.88 (48)	3.62 (92)	.96 (24)	.62 (16)	.75 (19)
CP350C3	P201424	350kcmil	9.12 (232)	1.62 (41)	1.12 (28)	2.00 (51)	3.62 (92)	.96 (24)	.71 (18)	.88 (22)
CP400C3	R218331	400kcmil	9.12 (232)	1.62 (41)	1.12 (28)	2.00 (51)	3.62 (92)	.96 (24)	.71 (18)	.88 (22)
CP500C3	T211686	500kcmil	10 .00 (254)	1.88 (48)	1.62 (41)	2.88 (73)	3.62 (92)	1.19 (30)	.85 (22)	1.05 (27)
CP750C3	D217307	750kcmil	10.13 (257)	2.50 (64)	2.00 (51)	2.88 (73)	3.75 (95)	1.31 (33)	1.06 (27)	1.32 (34)



Type C5 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm) A	B	D	J	L	M
CP4/0C5	K216278	4/0	10.37 (263)	1.44 (37)	1.12 (28)	3.62 (92)	.96 (24)	1.12 (28)
CP250C5	Z214750	250kcmil	10.37 (263)	1.44 (37)	1.12 (28)	3.62 (92)	.96 (24)	1.12 (28)
CP350C5	Z211162	350kcmil	10.37 (263)	1.62 (41)	1.12 (28)	3.62 (92)	.96 (24)	1.12 (28)
CP500C5	Z214244	500kcmil	10.37 (263)	1.88 (48)	1.62 (41)	3.62 (92)	1.19 (30)	1.50 (38)
CP750C5	T218333	750kcmil	10.50 (267)	2.50 (64)	2.00 (51)	3.75 (95)	1.31 (33)	2.00 (51)

* kcmil = MCM

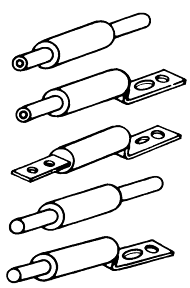
TYPE 1–Cable to cable

TYPE 3–Cable to offset bus

TYPE 5–Bus to offset bus

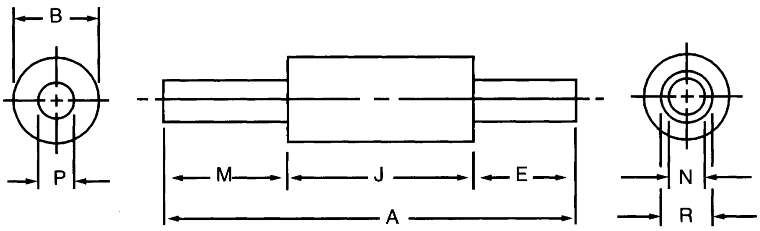
TYPE 6–Mole to cable

TYPE 8–Mole to offset bus



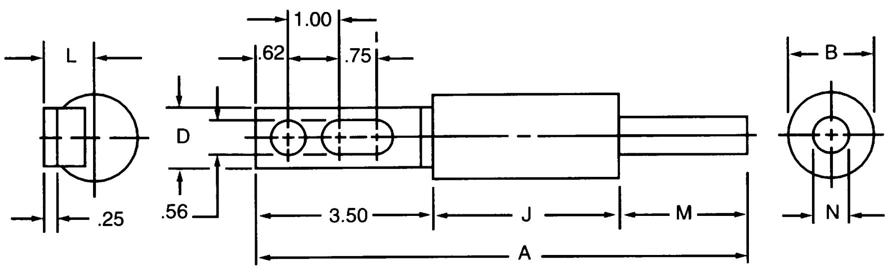
Cable Protectors

CP & CPH



Type C6 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm)							
			A	B	E	J	M	N	P	R
CP4/0C6	B217305	4/0	7.87 (200)	1.44 (37)	1.75 (44)	3.62 (92)	2.50 (64)	.55 (14)	.52 (13)	.68 (17)
CP250C6	E215767	250kcmil	8.00 (203)	1.44 (37)	1.88 (48)	3.62 (92)	2.50 (64)	.62 (16)	.58 (14)	.75 (19)
CP350C6	S211685	350kcmil	8.12 (206)	1.62 (41)	2.00 (51)	3.62 (92)	2.50 (64)	.71 (18)	.68 (17)	.88 (22)
CP500C6	F215262	500kcmil	9 .38 (238)	1.88 (48)	2.88 (73)	3.62 (92)	2.88 (73)	.85 (22)	.81 (21)	1.05 (27)
CP750C6	F218850	750kcmil	9.51 (427)	2.50 (64)	2.88 (73)	3.75 (95)	2.88 (73)	1.06 (27)	1.00 (25)	1.32 (34)



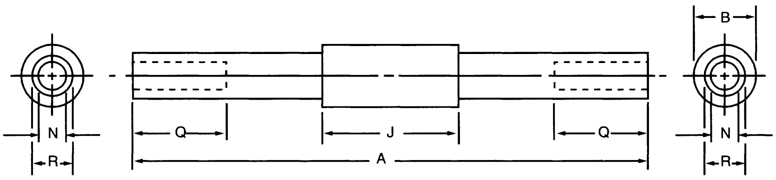
Type C8 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm)						
			A	B	D	J	L	M	N
CP4/0C8	F217815	4/0	9.62 (244)	1.44 (37)	1.12 (28)	3.62 (92)	.96 (24)	2.50 (64)	.52 (13)
CP250C8	K216784	250kcmil	9.62 (244)	1.44 (37)	1.12 (28)	3.62 (92)	.96 (24)	2.50 (64)	.58 (14)
CP350C8	Y212196	350kcmil	9.62 (244)	1.62 (41)	1.12 (28)	3.62 (92)	.96 (24)	2.50 (64)	.68 (17)
CP500C8	L216279	500kcmil	10.00 (254)	1.88 (48)	1.62 (41)	3.62 (92)	1.19 (30)	2.88 (73)	.81 (21)
CP750C8	V219369	750kcmil	10.13 (257)	2.50 (64)	2.00 (51)	3.75 (95)	1.31 (33)	2.88 (73)	1.00 (25)

* kcmil = MCM

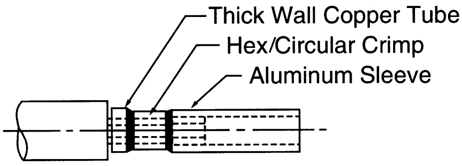
Cable Protectors

CP & CPH

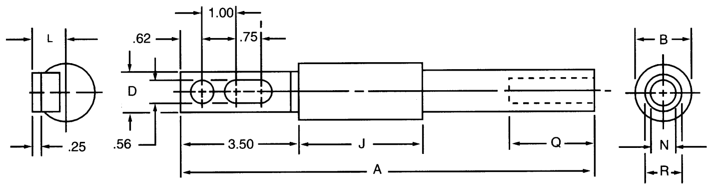


Type A1 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm)					
			A	B	J	N	Q	R
CP4/0A1	N212716	4/0	13.88 (353)	1.44 (37)	3.62 (92)	.55 (14)	2.50 (64)	.85 (22)
CP250A1	R211684	250kcmil	13.88 (353)	1.44 (37)	3.62 (92)	.59 (15)	2.50 (64)	.94 (24)
CP350A1	C218847	350kcmil	13.88 (353)	1.62 (41)	3.62 (92)	.71 (18)	2.50 (64)	1.13 (29)
CP500A1	D218848	500kcmil	15.38 (391)	1.88 (48)	3.62 (92)	.85 (22)	2.88 (73)	1.33 (34)
CP750A1	A212198	750kcmil	15.50 (394)	2.50 (64)	3.75 (95)	1.06 (27)	2.88 (73)	1.62 (41)

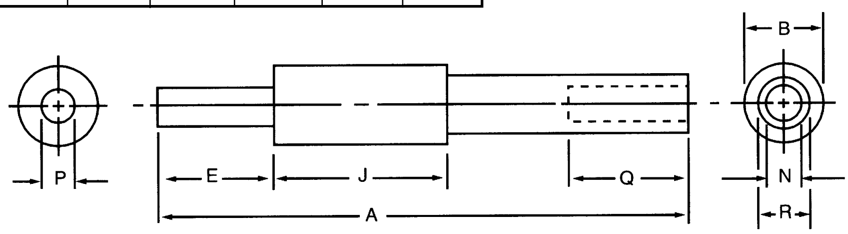


Typical Terminal Assembly Details



Type A3 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm)							
			A	B	D	J	L	N	Q	R
CP4/0A3	Y213231	4/0	12.25 (311)	1.44 (37)	1.12 (28)	3.62 (92)	.96 (24)	.55 (14)	2.50 (64)	.85 (22)
CP250A3	X212195	250kcmil	12.25 (311)	1.44 (37)	1.12 (28)	3.62 (92)	.96 (24)	.59 (15)	2.50 (64)	.94 (24)
CP350A3	R219366	350kcmil	12.25 (311)	1.62 (41)	1.12 (28)	3.62 (92)	.96 (24)	.71 (18)	2.50 (64)	1.13 (29)
CP500A3	S219367	500kcmil	13.00 (330)	1.88 (48)	1.62 (41)	3.62 (92)	1.19 (30)	.85 (22)	2.88 (73)	1.33 (34)
CP750A3	A214245	750kcmil	13.12 (333)	2.50 (64)	2.00 (51)	3.75 (95)	1.31 (33)	1.06 (27)	2.88 (73)	1.62 (41)



Type A6 – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE* SIZE	DIMENSIONS - INCHES (mm)							
			A	B	E	J	N	P	Q	R
CP4/0A6	P213729	4/0	11.25 (286)	1.44 (37)	2.50 (64)	3.62 (92)	.55 (14)	.52 (13)	2.50 (64)	.85 (22)
CP250A6	M212715	250kcmil	11.25 (286)	1.44 (37)	2.50 (64)	3.62 (92)	.59 (15)	.58 (14)	2.50 (64)	.94 (24)
CP350A6	E222575	350kcmil	11.25 (286)	1.62 (41)	2.50 (64)	3.62 (92)	.71 (18)	.68 (17)	2.50 (64)	1.13 (29)
CP500A6	F222576	500kcmil	12.38 (314)	1.88 (48)	2.88 (73)	3.62 (92)	.85 (22)	.81 (21)	2.88 (73)	1.33 (34)
CP750A6	G215769	750kcmil	12.50 (318)	2.50 (64)	2.88 (73)	3.75 (95)	1.06 (27)	1.00 (25)	2.88 (73)	1.59 (41)

* kcmil = MCM

Note: Inside surface of sleeve ends is coated with oxide inhibitor and capped.

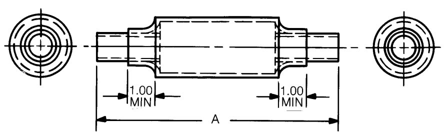
Type 5 – Use Copper Cable Protectors Type C5

Type 8 – Use Copper Cable Protectors Type C8

Cable Protectors

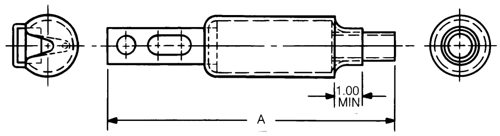
CP & CPH

Copper Cable Protectors with Heat Shrinkable Tubing*



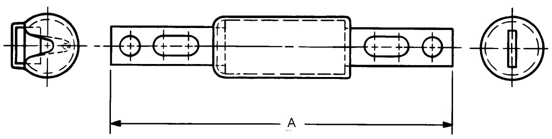
Type C1, Copper Cable – Dimensions

CABLE SIZE	A		CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING	
	INCHES	(mm)	CAT. NUMBER	REF. NUMBER
4/0	7.12	(180)	CP4/0C1-HS	A214751
250kcmil	7.38	(188)	CP250C1-HS	N213728
350kcmil	7.62	(194)	CP350C1-HS	C200884
500kcmil	9.38	(238)	CP500C1-HS	C201942
750kcmil	9.51	(242)	CP750C1-HS	N216787



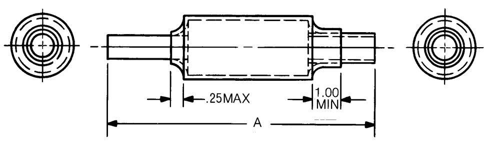
Type C3, Copper Cable – Dimensions

CABLE SIZE	A		CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING	
	INCHES	(mm)	CAT. NUMBER	REF. NUMBER
4/0	8.87	(225)	CP4/0C3-HS	-
250kcmil	9.00	(229)	CP250C3-HS	-
350kcmil	9.12	(232)	CP350C3-HS	B201941
500kcmil	10.00	(254)	CP500C3-HS	P212717
750kcmil	10.13	(257)	CP750C3-HS	H217817



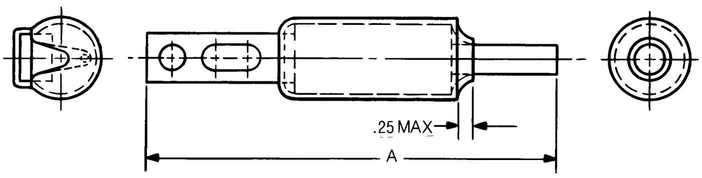
Type C5, Copper Cable – Dimensions

CABLE SIZE	A		CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING	
	INCHES	(mm)	CAT. NUMBER	REF. NUMBER
4/0	10.37	(263)	CP4/0C5-HS	-
250kcmil	10.37	(263)	CP250C5-HS	D215260
350kcmil	10.37	(263)	CP350C5-HS	-
500kcmil	10.37	(263)	CP500C5-HS	B214752
750kcmil	10.50	(267)	CP750C5-HS	-



Type C6, Copper Cable – Dimensions

CABLE SIZE	A		CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING	
	INCHES	(mm)	CAT. NUMBER	REF. NUMBER
4/0	7.87	(200)	CP4/0C6-HS	-
250kcmil	8.00	(203)	CP250C6-HS	-
350kcmil	8.12	(206)	CP350C6-HS	-
500kcmil	9.38	(238)	CP500C6-HS	-
750kcmil	9.51	(242)	CP750C6-HS	-



Type C8, Copper Cable – Dimensions

CABLE SIZE	A		CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING	
	INCHES	(mm)	CAT. NUMBER	REF. NUMBER
4/0	9.62	(244)	CP4/0C8-HS	-
250kcmil	9.62	(244)	CP250C8-HS	A217304
350kcmil	9.62	(244)	CP350C8-HS	-
500kcmil	10.00	(254)	CP500C8-HS	M216786
750kcmil	10.13	(257)	CP750C8-HS	-

* Transparent heat shrinkable tubing is supplied separately with **-HS** Catalog No. Maximum curing conditions: 5 seconds at 450ÞF.

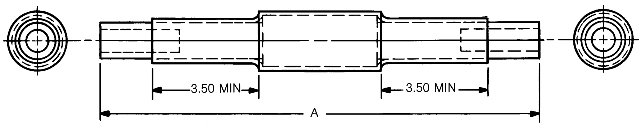
Special Purpose Fuses

North American

Cable Protectors

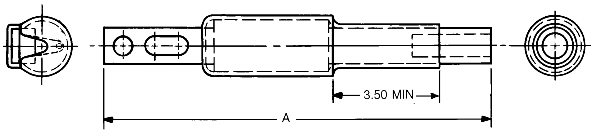
CP & CPH

Aluminum Cable Protectors with Heat Shrinkable Tubing*



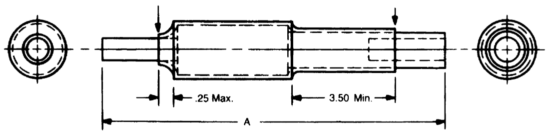
Type A1, Copper Cable – Dimensions

CABLE SIZE	A INCHES	A (mm)	CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING CAT. NUMBER	REF. NUMBER
4/0	13.88	(353)	CP4/0A1-HS	-
250kcmil	13.88	(353)	CP250A1-HS	-
350kcmil	13.88	(353)	CP350A1-HS	-
500kcmil	15.38	(391)	CP500A1-HS	-
750kcmil	15.50	(394)	CP750A1-HS	Q212718



Type A3, Copper Cable – Dimensions

CABLE SIZE	A INCHES	A (mm)	CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING CAT. NUMBER	REF. NUMBER
4/0	12.25	(311)	CP4/0A3-HS	-
250kcmil	12.25	(311)	CP250A3-HS	-
350kcmil	12.25	(311)	CP350A3-HS	N219892
500kcmil	13.00	(330)	CP500A3-HS	-
750kcmil	13.12	(333)	CP750A3-HS	-



Type A6, Copper Cable – Dimensions

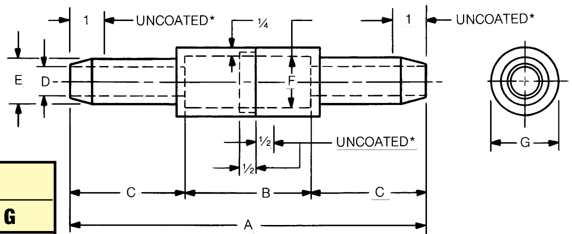
CABLE SIZE	A INCHES	A (mm)	CABLE PROTECTOR WITH HEAT SHRINKABLE TUBING CAT. NUMBER	REF. NUMBER
4/0	11.25	(286)	CP4/0A6-HS	-
250kcmil	11.25	(286)	CP250A6-HS	-
350kcmil	11.25	(286)	CP350A6-HS	-
500kcmil	12.38	(314)	CP500A6-HS	-
750kcmil	12.50	(318)	CP750A6-HS	-

Type 5 – Use Copper Cable Protectors Type C5

Type 8 – Use Copper Cable Protectors Type C8

* Transparent heat shrinkable tubing is supplied separately with **-HS** Catalog Numbers. Maximum curing conditions: 5 seconds at 450ÞF.

Molded Rubber Insulating Sleeves**

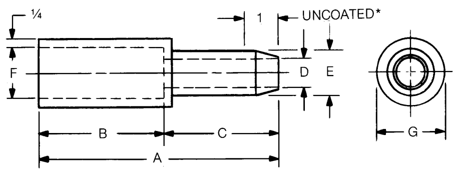


INSULATING SLEEVE

For Type C1 Copper Cable Protectors – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE SIZE	A	B	C	D	E	F	G
4/0CCR	D213236	4/0	10.44 (265)	3.69 (94)	3.38 (86)	.83 (21)	1.33 (33)	1.50 (38)	2.00 (51)
500CCR	E214755	500kcmil	14.19 (360)	3.69 (94)	5.25 (133)	1.31 (33)	1.81 (46)	1.94 (49)	2.44 (62)

DIMENSIONS - INCHES (mm)



INSULATING SLEEVE

For Type C3 Copper Cable Protectors – Dimensions

CATALOG NUMBER	REFERENCE NUMBER	CABLE SIZE	A	B	C	D	E	F	G
4/0CBR	D212201	4/0	7.06 (179)	3.69 (94)	3.38 (86)	.83 (21)	1.33 (33)	1.50 (38)	2.00 (51)
500CBR	V213734	500kcmi	8.94 (227)	3.69 (94)	5.25 (133)	1.31 (33)	1.81 (46)	1.94 (49)	2.44 (62)

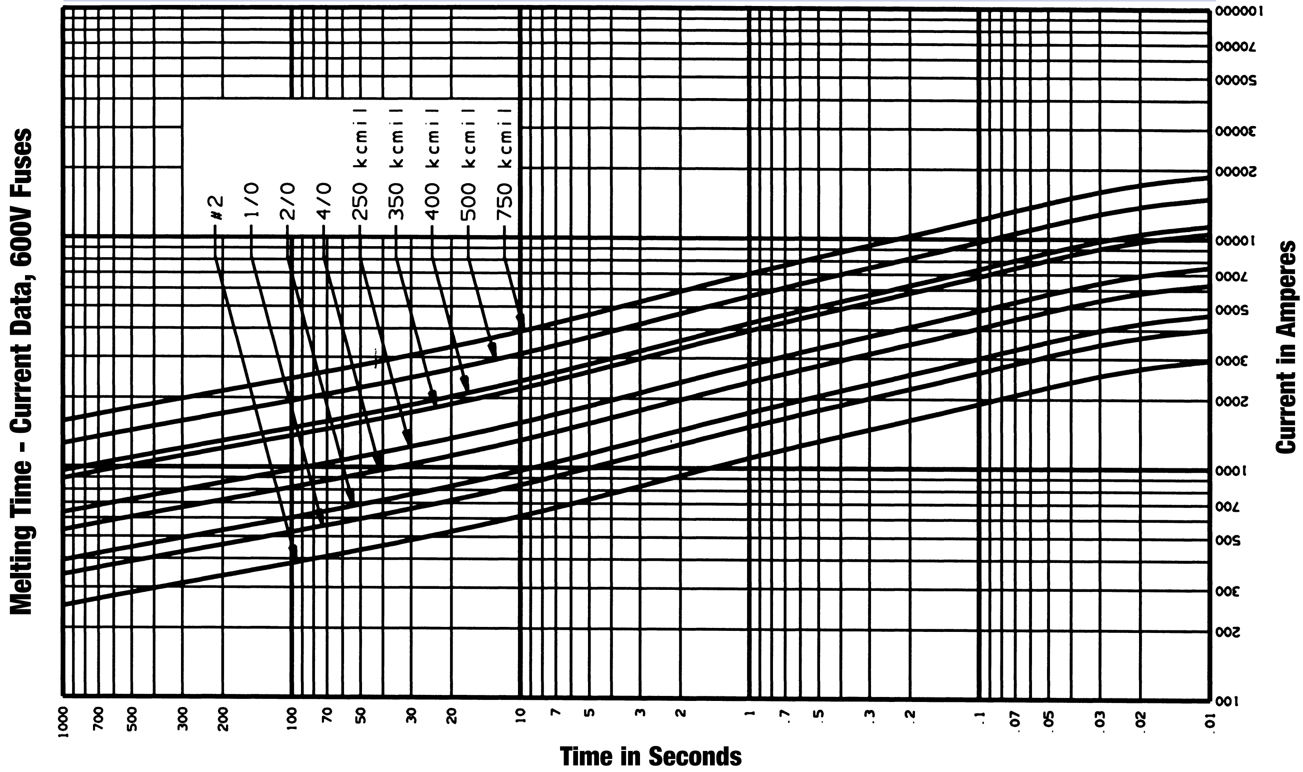
DIMENSIONS - INCHES (mm)

** Molded rubber insulating sleeves are ordered by their own catalog numbers, and not as suffixes to the cable protector catalog numbers. Neoprene coated except as noted.

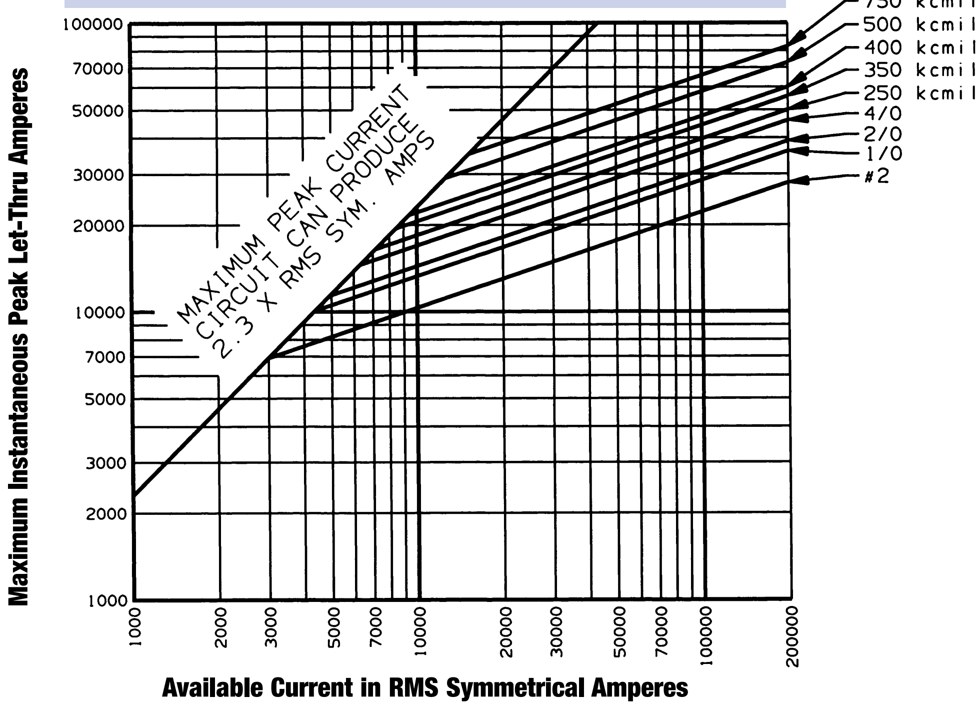
Cable Protectors

CP & CPH

Copper & Aluminum Cable Protectors - #2-750kcmil



Peak Let-Thru Current Data
Copper & Aluminum Cable Protectors - #2-750kcmil - 600V



Cable Protectors CP & CPH

Recommended Tooling For Installing CP Cable Protectors on Copper & Aluminum Cables

Circular Crimp – Copper Cable

Cable** Size	Burndy Hypress & Die Set				
	Y34A	Y35	Y39	Y46*	Y48B
4/0	A28R	U28RT	U28RT	U28RT	C28R
250kcmil	A29R	U29RT	U29RT	U29RT	C29R
350kcmil	A31R	U31RT	U31RT	U31RT	C31R
500kcmil	A34R	U34RT	U34RT	U34RT	C34R
750kcmil	-	-	U39RT	U39RT	C39R

Circular Crimp – Aluminum Cable

Cable** Size	Y34A	Y35	Y39	Y46*	Y48B
4/0	-	U28ART	U28ART	U28ART	C28AR
250kcmil	-	U29ART	U29ART	U29ART	C29AR
350kcmil	-	U31ART	U31ART	U31ART	C31AR
500kcmil	-	U34ART	U34ART	U34ART	C34AR
750kcmil	-	-	U39ART	U39ART	C39AR

Hex/Circular Crimp – Copper Cable

Cable** Size	T & B Installing Tools				
	TBMB Tool	13642 Head		TBM 15 Head	
	Die	Die		Die	
	Cat. No.	Cat. No.	Code No.	Cat. No.	Code No.
4/0	13463	11740	54	15511	54H
250kcmil	13463	11771	62	15510	62
350kcmil	13466	11743	71H	15514	71H
500kcmil	13468	11746	87H	15506	87H
750kcmil	-	11749	106H	15515	106H

Hex/Circular Crimp – Aluminum Cable

Cable** Size	TBMB Tool Die Cat. No.	13642 Head Die Cat. No.	13642 Head Die Code No.	TBM 15 Head Die Cat. No.	TBM 15 Head Die Code No.
4/0	13465	11742	66H	15534	66
250kcmil	13466	11743	71H	15514	71H
350kcmil	13468	11746	87H	15506	87H
500kcmil	-	11749	106H	15515	106H
750kcmil	-	-	-	15603	125H

Hex/Circular Crimp – Copper Cable

Cable** Size	Homac Tools UT 15 Head Die		
	CAT. NUMBER	REF. NUMBER	Code No.
4/0	15511	C217168	54H
250kcmil	15510	-	62
350kcmil	15514	-	71H
500kcmil	15587	-	87H
750 kcmil	15500	-	106H

Hex/Circular Crimp – Aluminum Cable

Cable** Size	CAT. NUMBER	REF. NUMBER	Code No.
4/0	15534	-	66
250kcmil	15514	-	71H
350kcmil	15506	-	87H
500kcmil	15515	-	106H
750 kcmil	15603	-	125H

* with adapter P-U-ADP

** kcmil = MCM

Note: Crimping tools suitable for standard splicing sleeves are also suitable for CP cable protectors for copper and aluminum cables because Ferraz Shawmut uses standard commercial dimensions on both inside and outside diameters.

Welder Protectors

A4BX



WELDER PROTECTORS

Ferraz Shawmut Welder Protectors are special purpose limiters used to provide isolation of faulted welding equipment and protection for the cable drop supplying the welder. Welder Protectors have a high thermal capacity and are less affected by high ambient temperatures and extended weld times than similar size Class J or K fuses. Welder Protectors should only be applied for isolation of short circuited welding circuits. Overload protection must be provided for by other means.

Ratings

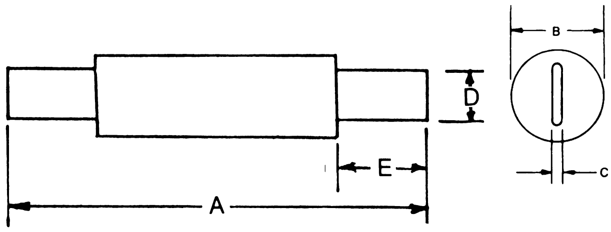
- ✔ 600VAC, 200kA I.R.

Approvals

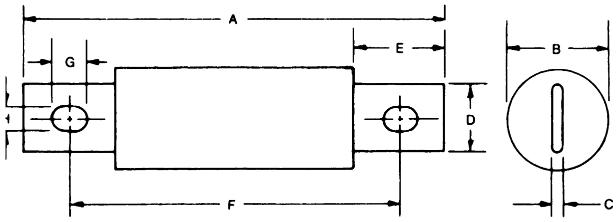
- ✔ Ferraz Shawmut Certified

Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER		REFERENCE NUMBER	
	CLASS K DIMENSION	CLASS J DIMENSION	CLASS K DIMENSION	CLASS J DIMENSION
100	A4BX100-150	-	J218876	-
125	A4BX125-150	-	D212224	-
150	A4BX150-150	-	S212743	-
200	A4BX200-150	A4BX200-150J	H217334	M217844
225	A4BX225-150	-	G211192	-
300	A4BX300-150	A4BX300-150J	J215288	K215795
400	A4BX400-150	A4BX400-150J	N217845	Y218360
500	A4BX500-150	-	M222605	-
600	A4BX600-150	-	F201968	-



CLASS K



CLASS J

A4BX ( ) - 150; Class K Dimensions

AMPERE RATING	INCHES							
	A	B	C	D	E	F	G	H
100	7-7/8	1	1/8	23/32	2-5/8	-	-	-
125-200	9-5/8	1-1/2	3/16	1-1/8	3-7/16	-	-	-
225-400	11-5/8	2	1/4	1-5/8	4-7/16	-	-	-
500-600	13-3/8	2-1/2	1/4	2	5-5/16	-	-	-

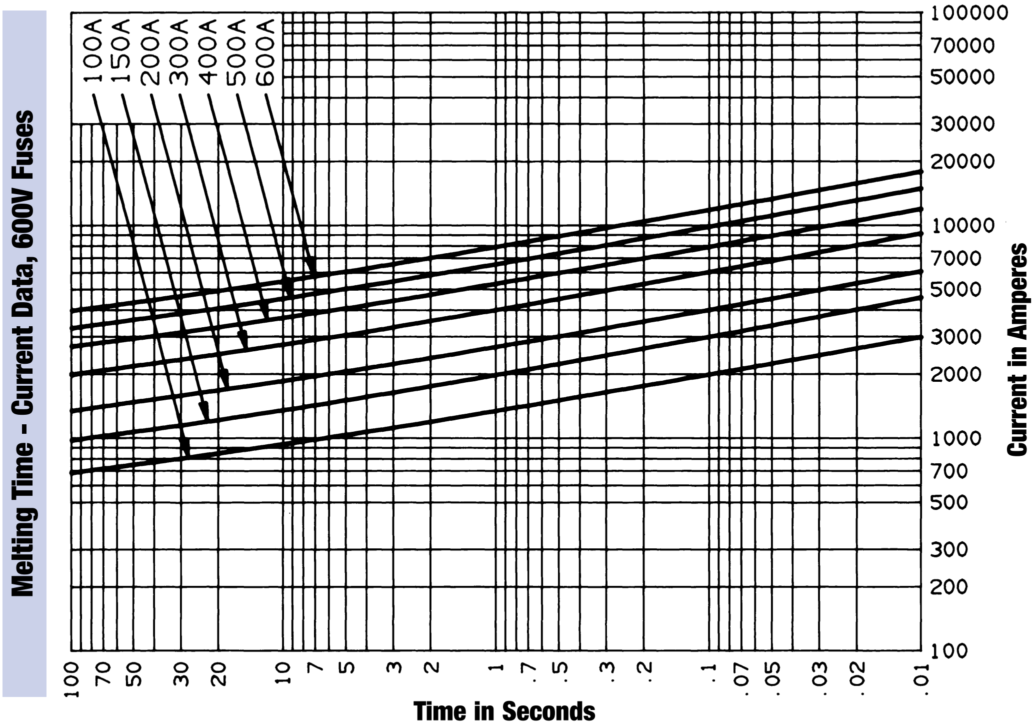
A4BX ( ) - 150J; Class J Dimensions

125-200	5-3/4	1-1/2	3/16	1-1/8	1-1/2	4-3/8	3/8	9/32
225-400	7-1/8	2	1/4	1-5/8	2-3/16	5-1/4	17/32	13/32

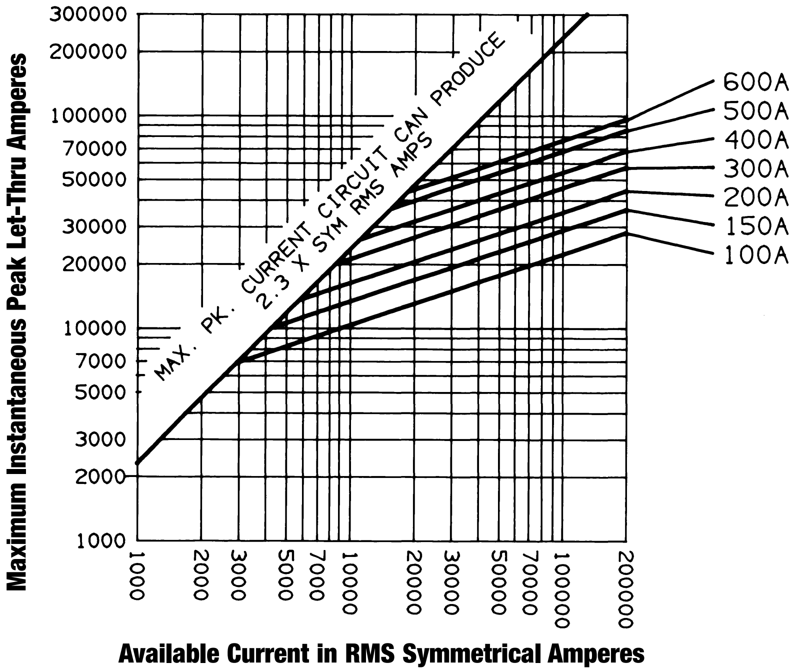
Welder Protectors

A4BX

A4BX100 to 600 Types 150, 150J



Peak Let-Thru Current Data – A4BX100 to 600, 600 Volts AC



Form 600

A2Y, A6Y



FORM 600 FUSES

Ferraz Shawmut Form 600 fuses were the original current-limiting fuses, pre-dating all the standards. Their 500V DC rating (through 600A) is a popular feature for special applications. Form 600 fuses provide a high degree of current limitation in AC and DC applications. Types 1 and 3 are dimensionally interchangeable with Class H and K fuses. Types 4 and 5 have unique rejection dimensions and are not interchangeable.

Ratings

- ✔ **AC:**
  A2Y 1-600A
  250VAC, 200kA I.R.
  A6Y 10-8A
  500VAC, 200kA I.R.
  A6Y 10-1200A
  600VAC, 200kA I.R.
- ✔ **DC:**
  A2Y 1-600A
  A6Y 10-600A
  500VDC, 100kA I.R.
  A6Y 1-8A
  500VDC, 200kA I.R.

Approvals

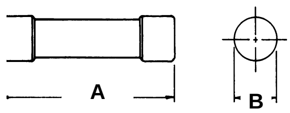
- ✔ AC: Guide No. JFHR2 (1-600A)
- ✔ DC Tested to UL198L Parameters (1-600A)
- ✔ UL Recognized Component

A2Y –Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER
1	A2Y1-1	W222613	30	A2Y30-1	N213268	80	A2Y80-4	F218367	175	A2Y175-4	B212751	400	A2Y400-4	B219927
2	A2Y2-1	P201976	35	A2Y35-1	E213766	90	A2Y90-3	H219404	200	A2Y200-3	L213266	450	A2Y450-3	V222612
3	A2Y3-1	P212234	40	A2Y40-1	N214280	90	A2Y90-4	C219928	200	A2Y200-4	D213765	450	A2Y450-4	J223131
5	A2Y5-1	R215295	45	A2Y45-1	N214786	100	A2Y100-3	S218884	250	A2Y250-3	Q215294	500	A2Y500-3	R200920
6	A2Y6-1	Y216313	50	A2Y60-1	T215803	100	A2Y100-4	F219402	250	A2Y250-4	S215802	500	A2Y500-4	E201461
8	A2Y8-1	G218368	60	A2Y60-1	B216822	125	A2Y125-3	Q200919	300	A2Y300-3	A216821	500	A2Y500-5	N201975
10	A2Y10-1	K223132	70	A2Y70-3	C212752	125	A2Y125-4	D201460	300	A2Y300-4	R217342	600	A2Y600-3	P211199
15	A2Y15-1	F201462	70	A2Y70-4	M213267	150	A2Y150-3	M201974	350	A2Y350-3	W217852	600	A2Y600-4	F211720
20	A2Y20-1	Q211200	70	A2Y70-5	M214279	150	A2Y150-4	N211198	350	A2Y350-4	T218885	600	A2Y600-5	N212233
25	A2Y25-1	G211721	80	A2Y80-3	X217853	175	A2Y175-3	M212232	400	A2Y400-3	G219403			

A6Y –Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER	AMPERE RATING	CAT. NUMBER	REF. NUMBER
1	A6Y1-1	H216828	70	A6Y70-4	J212758	200	A6Y200-4	N223135	450	A6Y450-4	X215300
2	A6Y2-1	Z200927	80	A6Y80-3	L213772	200	A6Y200-5	W200924	450	A6Y450-5	Z215808
3	A6Y3-1	W214793	80	A6Y80-4	V214286	225	A6Y225-3	V211204	500	A6Y500-3	X217347
5	A6Y5-1	R219412	90	A6Y90-3	A215809	225	A6Y225-4	T212238	500	A6Y500-4	M218373
6	A6Y6-1	A200928	90	A6Y90-3	A215809	225	A6Y225-5	G212756	500	A6Y500-5	B218892
8	A6Y8-1	Q211729	100	A6Y100-4	Z222616	250	A6Y250-3	S213272	600	A6Y600-3	Q223137
10	A6Y10-1	N218374	100	A6Y100-3	F219931	250	A6Y250-4	S214284	600	A6Y600-4	L201467
15	A6Y15-1	K219935	125	A6Y125-4	F212755	250	A6Y250-5	S214790	600	A6Y600-5	W201982
20	A6Y20-1	Y211207	125	A6Y125-3	S212237	300	A6Y300-3	Y215807	650	A6Y650-4	X211206
25	A6Y25-1	W213275	125	A6Y125-5	R213271	300	A6Y300-4	F216826	650	A6Y650-4	X211206
30	A6Y30-1	F216320	150	A6Y150-3	R214283	300	A6Y300-5	W217346	800	A6Y800-4	V214792
35	A6Y35-1	F217861	150	A6Y150-4	R214789	350	A6Y350-3	A218891	800	A6Y800-5	Y215301
40	A6Y40-1	P218375	150	A6Y150-5	V215298	350	A6Y350-4	H219933	1000	A6Y1000-4	M223134
45	A6Y45-1	D218894	175	A6Y175-3	B217857	400	A6Y400-3	W211205	1000	A6Y1000-5	V200923
50	A6Y50-1	S223139	175	A6Y175-4	K218371	400	A6Y400-4	V212239	1200	A6Y1200-5	K211724
60	A6Y60-1	Z211208	175	A6Y175-5	Z218890	400	A6Y400-5	H212757	1200	A6Y1200-5	K211724
70	A6Y70-3	W212240	200	A6Y200-3	A222617	450	A6Y450-3	T214791			



Type 1, 1-60 Amperes Class K Dimensions

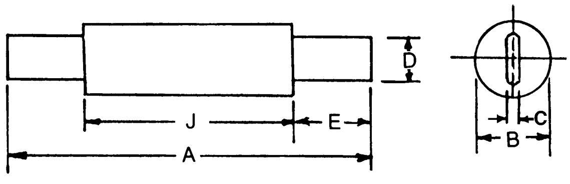
AMPERE RATING	INCHES A	INCHES B
A2Y - 1-60A		
1-30	2	9/16
35-60	3	13/16
A6Y - 1-60A		
1-30	5	13/16
35-60	5-1/2	1-1/16

Form 600

A2Y, A6Y

Type 3, 70-600 Amperes, Class K Dimensions

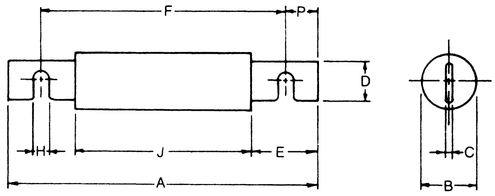
AMPERE RATING	INCHES					
	A	B	C	D	E	J
250 VAC/500 VDC - A2Y (Amp) - 3						
70-100	5-7/8	1	1/8	23/32	1-5/8	2-21/32
125-200	7-1/8	1-1/2	3/16	1-1/8	2-3/16	2-25/32
225-400	8-5/8	2	1/4	1-5/8	2-15/16	2-25/32
450-600	10-3/8	2-1/2	1/4	2	3-13/16	2-25/32
600 VAC/500 VDC - A6Y (Amp) - 3						
70-100	7-7/8	1	1/8	23/32	2-5/8	2-21/32
110-200	9-5/8	1-1/2	3/16	1-1/8	3-7/16	2-25/32
225-400	11-5/8	2	1/4	1-5/8	4-7/16	2-25/32
450-600	13-3/8	2-1/2	1/4	2	5-5/16	2-25/32



TYPE 3 70-600A

Type 4, 70-600 Amperes – Dimensions

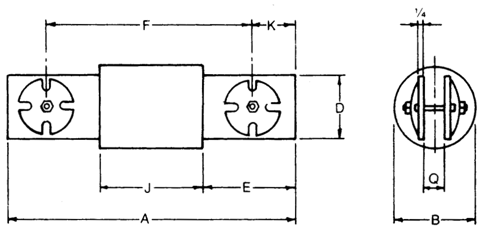
AMPERE RATING	INCHES								
	A	B	C	D	E	F	H	J	P
250 VAC/500 VDC - A2Y (Amp) - 4									
70-100	5-7/8	1	1/8	23/32	1-5/8	4-7/8	13/64	2-21/32	1/2
125-200	7-1/8	1-1/2	3/16	1-1/8	2-3/16	5-3/4	17/64	2-25/32	11/16
225-400	8-5/8	2	1/4	1-5/8	2-15/16	6-3/4	21/64	2-25/32	15/16
450-600	10-3/8	2-1/2	1/4	2	3-13/16	8-1/8	25/64	2-25/32	1-1/8
600 VAC/500 VDC - A6Y (Amp) - 4									
70-100	7-7/8	1	1/8	23/32	2-5/8	6-7/8	13/64	2-21/32	1/2
125-200	9-5/8	1-1/2	3/16	1-1/8	3-7/16	8-1/4	17/64	2-25/32	11/16
225-400	11-5/8	2	1/4	1-5/8	4-7/16	9-3/4	21/64	2-25/32	15/16
450-600	13-3/8	2-1/2	1/4	2	5-5/16	11-1/8	25/64	2-25/32	1-1/8



TYPE 4 70-600A

Type 4, 650-1200 Amperes – Dimensions

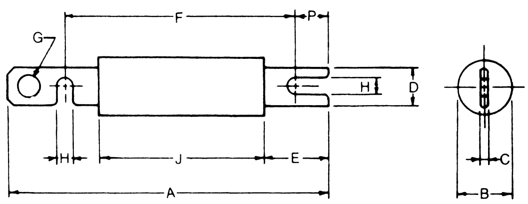
AMPERE RATING	INCHES							
	A	B	D	E	F	J	K	Q
600 VAC only - A6Y (Amp) - 4								
650-1200	10-1/2	3	2	3-3/8	7-7/8	3-3/4	1-5/16	5/8



TYPE 4 650-1200A

Type 5, 125-600 Amperes/Hinge Disconnect type – Dimensions

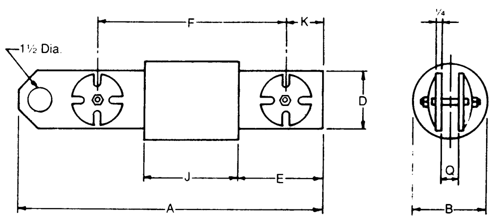
AMPERE RATING	INCHES									
	A	B	C	D	E	F	G	H	J	P
600 VAC/500 VDC - A6Y (Amp) - 5										
125-200	10-3/4	1-1/2	3/16	1-1/8	3-7/16	8-1/4	3/4	17/64	2-25/32	11/16
225-400	13-1/4	2	1/4	1-5/8	4-7/16	9-3/4	7/8	21/64	2-25/32	15/16
450-600	15-3/16	2-1/2	1/4	2	5-5/16	11-1/8	1	25/64	2-25/32	1



TYPE 5 125-600A

Type 5, 650-1200 Amperes/Hinge Disconnect Type – Dimensions

AMPERE RATING	INCHES							
	A	B	D	E	F	J	K	Q
600 VAC only - A6Y (Amp) - 5								
650-1200	12-1/8	3	2	3-3/8	7-7/8	3-3/4	1-5/16	5/8



TYPE 5 650-1200A

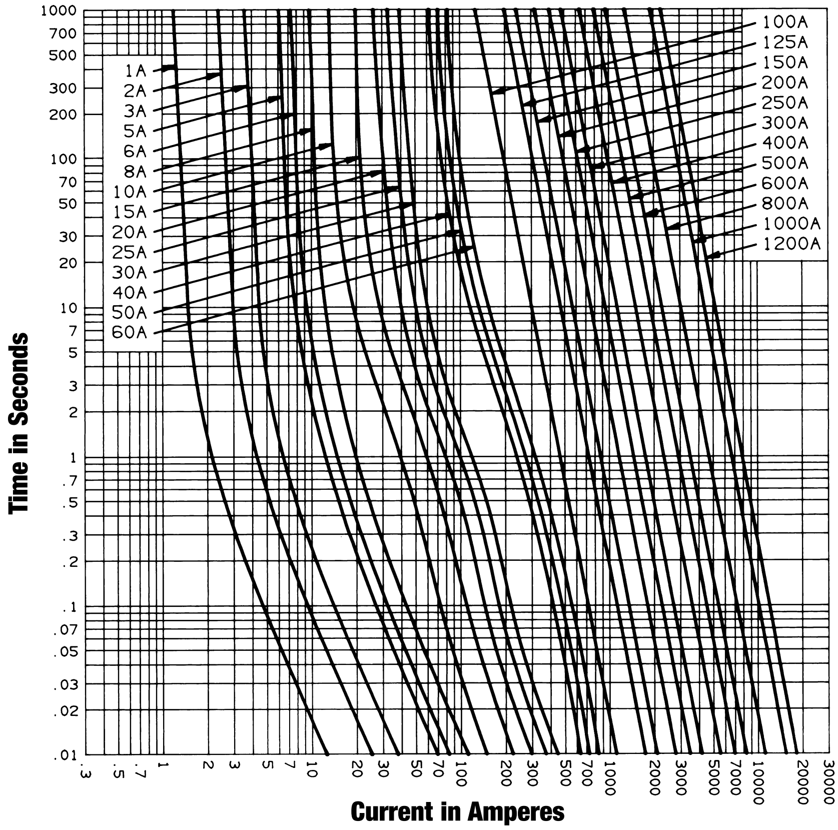
Special Purpose Fuses

North American

Form 600 A2Y, A6Y

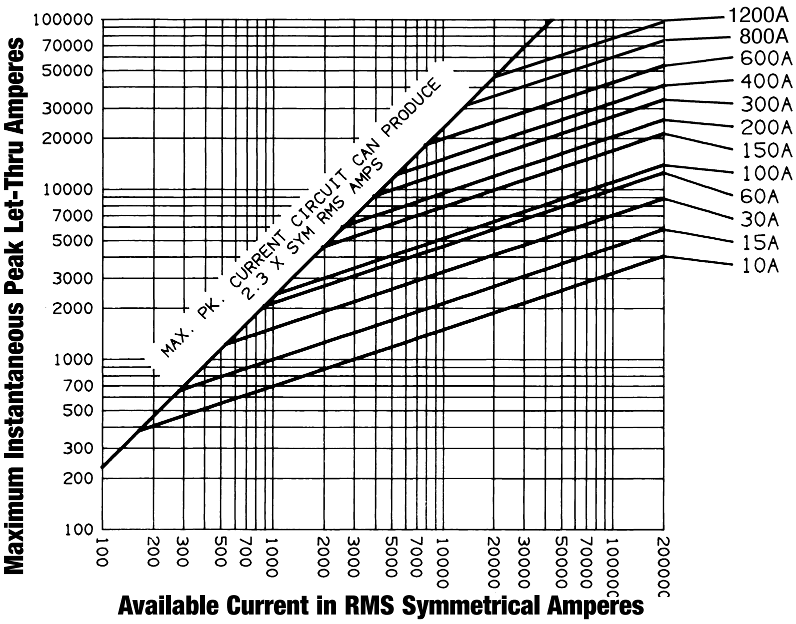
1-600 Amperes, 250 or 600 Volts - Types 1, 3 or 5   800-1200 Amperes, 600 Volts - Types 4 or 5

Melting Time - Current Data



10-600 Amperes, 250 or 600 Volts   800-1200 Amperes, 600 Volts only

Peak Let-Thru Current Data



DC Capability

Catalog No. Prefix	Ampere Rating	DC Voltage Rating*
A2Y	1-600	500
A6Y	1-600	500

*Consult factory for specifics regarding circuit time constants and DC interrupting rating.

Recommended Fuse Blocks With Box Connectors For Form 600 Types 1 & 3 Fuses

Ampere Rating	250V 1 Pole	250V 3 pole	600V 1 pole	600V 3 pole
CATALOG NUMBER				
1-30	20306	20308	60306	60308
31-60	20606	20608	60606	60608
61-100	21036	21038	61036	61038
101-200	22001	22003	62001	62003
201-400	24001	24003	64001	64003
401-600	2631	2633	6631	6633
REFERENCE NUMBER				
1-30	Z212381	F215446	V211871	X213920
31-60	N211865	C214431	X211873	Z213922
61-100	S201105	Q211867	K201627	S211363
101-200	Y213415	E214433	M212393	H213424
201-400	T219046	-	H218530	T219575
401-600	F214434	K215450	Z216475	W217507

A variety of pole configurations and termination provisions is available. Refer to Fuse Blocks and Fuse Holders section for details.

Plug Fuses

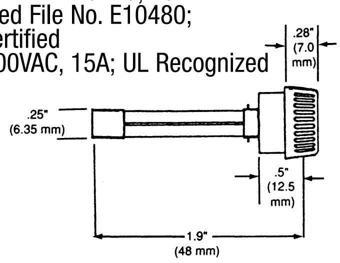


300 VOLT IN-LINE FUSES: SLR & SMF
300 VOLT IN-LINE HOLDER: SHR

Ferraz Shawmut In-Line SLR and SMF fuses are for use in SHR in-line fuse holders, commonly used for the protection of fluorescent light fixtures, etc. SLR fuses are non-time delay and SMF fuses are time delay, both with a 300 volt rating and many ampere ratings.

Ratings & Approvals

- ✔ **AC: SLR & SMF** - 300VAC, 100A I.R.
  125VAC, 10kA I.R.
  UL Listed File No. E10480;
  CSA Certified
  SHR - 300VAC, 15A; UL Recognized



Ampere Ratings, Reference Numbers

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER
500mA	SLR1/2	M215521
1A	SLR1	Q211936
1-1/2A	SLR1-1/2	C212453
1-6/10A	SLR1-6/10	T213986
2A	SLR2	Q217571
2-1/2A	SLR2-1/2	X218083
3A	SLR3	A218592
4A	SLR4	T219115
5A	SLR5	P219640
6A	SLR6	A222088
7A	SLR7	N222836
8A	SLR7	N222836
9A	SLR9	T201175
10A	SLR10	V216034
12A	SLR12	Q216536
15A	SLR15	F217056
500mA	SMF1/2	R211937
600mA	SMF6/10	E215008
800mA	SMF8/10	R216537
1A	SMF1	Y201685
1-1/4A	SMF1-1/4	P205702
1-6/10A	SMF1-6/10	P211429
2A	SMF2	D212454
2-1/2A	SMF2-1/2	M212968
2-8/10	SMF2-8/10	W213482
3A	SMF3	V213987
3-2/10	SMF3-2/10	D214501



PLUG FUSES: G/GP/TD/GW /GTL/GT/GSL

Ferraz Shawmut Plug Fuses are for industrial and residential applications.
Standard non-time delay fuses are for receptacle and lighting circuits. Standard time delay fuses are for motor loads. For Canadian requirements, a type "P" fuse is used for non-motor loads and type "D" fuses are used for electric heating and cycling loads circuits. Both fuses have low melting-point temperature elements. Low-Temp time delay plug fuses have thermal sensitivity are also for cycling loads and motor circuits. Type "S" plug fuses are time delay and tamper-resistant.

Ratings

- ✔ 125V AC, 10kA I.R.
- ✔ 3 to 30 Amperes
- ✔ Choice of Edison Base, Types "P", "D", or "S"

Approvals

- ✔ UL Listed
  Guide JEFV, File E76208
- ✔ CSA Certified
  Class 142301, File 15525

PLUG FUSES – Standard Fuse Ampere Ratings, Reference Numbers

AMPERE RATING	EDISON BASE Non-Time Delay UL	Non-Time Delay CSA	Time Delay UL	"P" Type Non-Time Delay CSA	Low-Temp Time-Delay UL	"D" Type Time Delay CSA	TYPE S Rejection Time Delay UL
CATALOG NUMBER							
3	GW3	G3	-	-	-	-	-
6	GW6	G6	-	-	-	-	-
10	GW10	G10	-	-	-	-	-
15	GW15	-	GTL15	GP15	GT15	TD15	GSL15
20	GW20	-	GTL20	GP20	GT20	TD20	GSL20
25	GW25	-	GTL25	GP25	GT25	TD25	GSL25
30	GW30	-	GTL30	GP30	GT30	TD30	GSL30
REFERENCE NUMBER							
3	G214389	V218472	-	-	-	-	-
6	K215404	N218995	-	-	-	-	-
10	K212345	N217960	-	-	-	-	-
15	V212860	-	K219521	-	K217451	P201056	C213373
20	D213374	-	N222721	Y223236	T217965	R211822	F214388
25	X213874	-	T201060	F211306	A218477	T213871	J215403
30	G214895	-	B203804	T212859	S218999	H215908	Q216421

FR15, FR20 Rejector Rings
FRW Rejection tool

Surge Suppresion Fuses VSP



Ferraz Shawmut surge suppression fuses are specially designed to address the protection of TVSS systems. Surge suppression fuses have been specially designed to withstand 8x20 µSec surge pulses without opening, allowing the TVSS system to react to the surge. All surge suppression fuses have a 8x20 µSec surge rating, not a continuous current rating. Under AC short circuit conditions these surge suppression fuses are very current limiting.

Features/Benefits

- ✔ **VSP fuses** rated 600 VAC, 200kA I.R.
- ✔ **Surge Ratings** of 5-100kA pulses
- ✔ **Designed** to help meet UL1449 Second Edition Requirements
- ✔ **Various Mounting Configurations**

Ratings

- ✔ 5-100 kA 8x20 µSec Weveform 600 VAC, 200 kA I.R.

Approvals

- ✔ UL Recognized Component
- ✔ File E60314, Vol.3 Special Purpose MOV Protector

APPLICATIONS:

- ✔ Protection of TVSS Devices

REFERENCE NUMBER	CATALOG NUMBER	8X20 µSEC SURGE RATING	MELTING I^2t (A^2s)	CLEARING I^2t (A^2s)	I_{PEAK} @ 100KA, 60 Hz (A)
-	VSP5	5,000	341	936	3,652
S217297	VSP10	10,000	1,541	3.744	5,794
-	VSP15	15,000	3,072	8,424	7,591
H218323	VSP20	20,000	4,992	14,400	9,194
-	VSP30	30,000	12,507	33,696	12,044
T201934	VSP40	40,000	19,543	59,904	14,588
-	VSP50	50,000	32,020	93,600	16,925
P212188	VSP60	60,000	42,808	134,784	19,110
Q213224	VSP70	70,000	61,152	183,456	21,176
P214235	VSP80	80,000	79,872	239,616	23,146
-	VSP90	90,000	99,000	303,264	25,034
T200876	VSP100	100,000	112,000	374,400	26,854

Recommended Fuse Blocks for VSP Fuses

VSP(5-20)-2 CATALOG NUMBER

NUMBER OF POLES	BOX	SCREW	PRESSURE PLATE
ADDER	30310	30320	30350
1	30311	30321	30351
2	30312	30322	30352
3	30313	30323	30353

VSP(5-20)-2 REFERENCE NUMBER

NUMBER OF POLES	BOX	SCREW	PRESSURE PLATE
ADDER	N211888	S218033	F214457
1	A212405	Y218544	G214964
2	E214456	K222787	L216486
3	F214963	B201642	Z217004

VSP(30-100)-2 CATALOG NUMBER

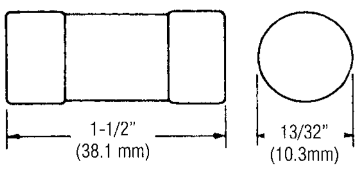
NUMBER OF POLES	BOX	SCREW	PRESSURE PLATE
ADDER	60305J	60315J	60325J
1	60306J	60316J	60326J
2	60307J	60317J	60327J
3	60308J	60318J	60328J

VSP(30-100)-2 REFERENCE NUMBER

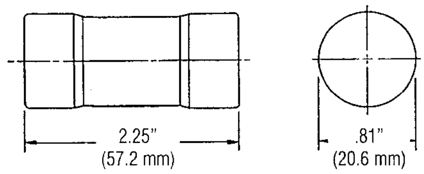
NUMBER OF POLES	BOX	SCREW	PRESSURE PLATE
ADDER	K204893	N218029	Y212403
1	J211884	P219065	T213434
2	S213433	Y222040	B214453
3	A214452	V223302	F215469

Surge Suppresion Fuses VSP

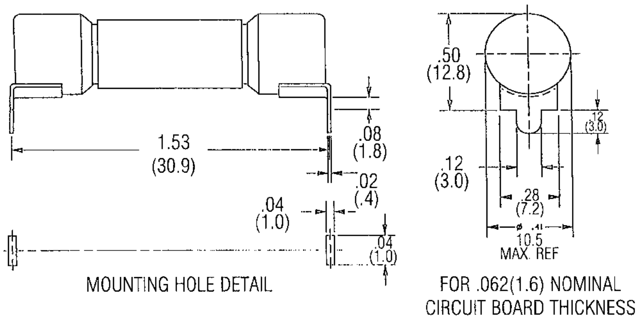
Dimensions



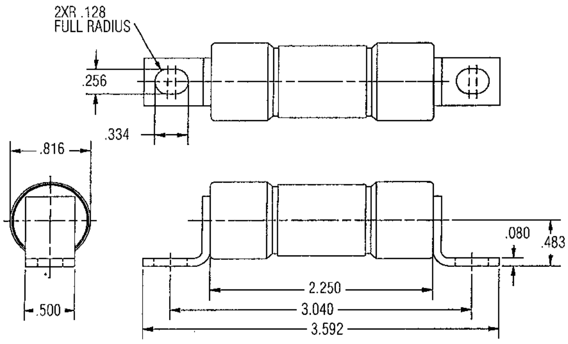
VSP(5-20)-2



VSP(30-100)-2

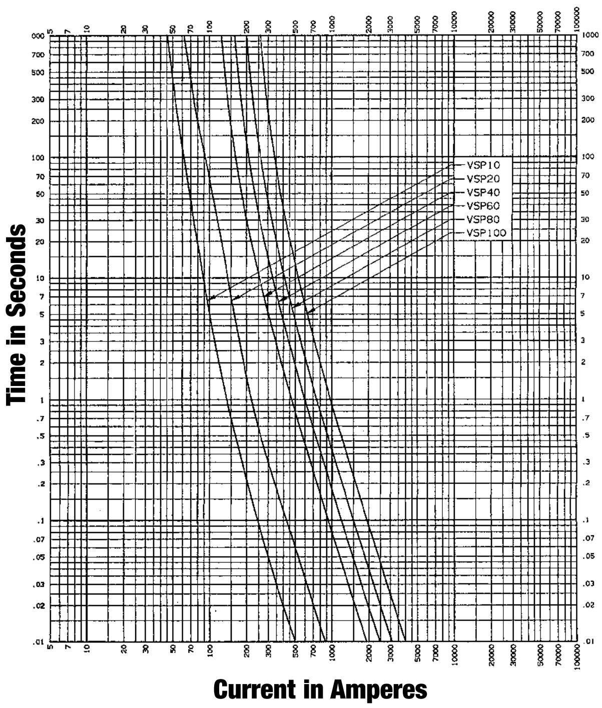


VSP(5-20)

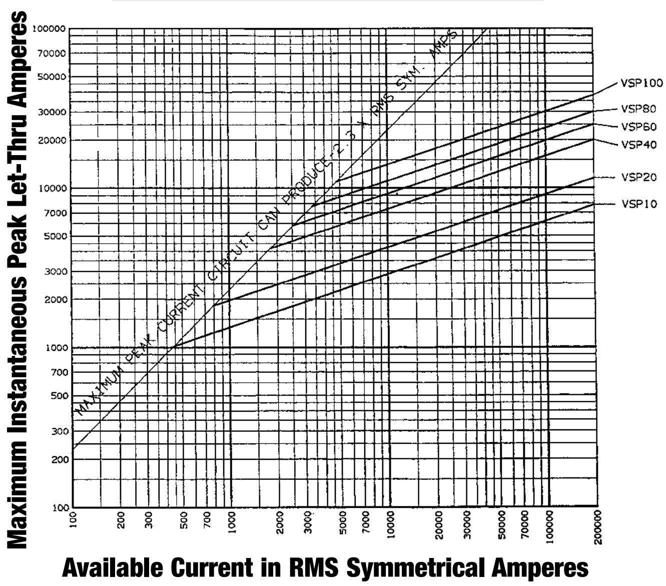


VSP(30-100)

Melting Time - Current Data

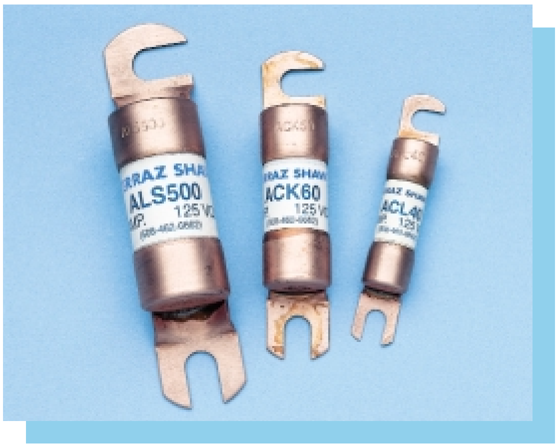


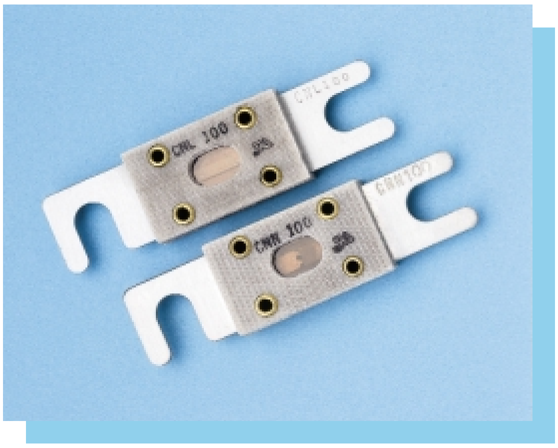
Peak Let-Thru Current Data



Forklift Fuses

ACK, ACL, ALS, CNN, CNL





FORKLIFT TRUCK FUSES

Ferraz Shawmut forklift truck and battery isolator fuses are specially designed for the heavy duty loads associated with DC battery powered equipment such as forklift trucks, hand trucks, motorized work platforms, and other DC battery operated systems. Rugged construction and stud mounted bolt-in design assure long life in adverse conditions for these fuses.

This expanded line of Forklift Truck Fuses can fulfill virtually all of your heavy duty circuit protection needs up to 125V AC or DC. The round body ACK, ACL and ALS fuses combine higher voltage ratings and more ampere ratings with higher interrrupting ratings. The flat CNL and CNN style fuses have a lower voltage rating but are also AC and DC, more space saving and have visual “see-thru” indication to show when they have operated.

Features / Benefits

- ✔ **All fuses** are AC and DC rated
- ✔ **Expanded Ampere Ratings**
- ✔ **Time Delay and General Purpose** types
- ✔ **Link is visible** through window (CNL/CNN)
- ✔ **Embossed Catalog Numbers** for permanent ID

HIGHLIGHTS:

- ✔ AC/DC Ratings
- ✔ Embossed Catalog Nos.
- ✔ Stud Mounted
- ✔ Time Delay - ACK
- ✔ General Purpose - ACL,ALS

APPLICATIONS:

- ✔ Forklift Trucks
- ✔ Battery Hand Trucks
- ✔ Motorized Work Platforms
- ✔ Battery Systems

Ratings

- ✔ **ACK:** 1-400 Amperes
  125VAC, 10kA I.R.
  125VDC (F.S. Certified)
- ✔ **ACL:** 30-120 Amperes
  125VAC, 10kA I.R.
  125VDC (F.S. Certified)
- ✔ **ALS:** 100-500 Amperes
  125VAC, 10kA I.R.
  125VDC (F.S. Certified)
- ✔ **CNL:** 35-500 Amperes
  32V AC/DC, 2500A I.R.
- ✔ **CNN:** 10-500 Amperes
  125VAC, 48VDC, 2500A I.R.
  600-800 Amperes
  125VAC, 48VDC, 2500A I.R.

Approvals

- ✔ UL Recognized Components (All Products)

Forklift Truck Fuse Cross Reference

PART NUMBER	COMPETITOR NAME	GOULD
ACK	Bussmann	ACK
ACL	Bussmann	ACL
ALS	Bussmann	ALS
ANL	Bussmann	CNL
ANN	Bussmann	CNN
AOK	Edison	ALS
CCK	Littelfuse	ACK
CCL	Litttelfuse	ACL
ECK	Edison	ACK
ECL	Edison	ACL
ENLE	Edison	CNL
ENNE	Edison	CNN

Forklift Truck Fuse Fuse Blocks

FUSE	FUSE BLOCK
ACK(70-100)	P243C
ACL(70-120)	P243E
CNL	P243G
CNN	P243G

Forklift Fuses ACK, ACL, ALS, CNN, CNL

ACK Fuse

AMPERE RATING	CAT. NUM.	REF. NUM.	AMPERE RATING	CAT. NUM.	REF. NUM.	AMPERE RATING	CAT. NUM.	REF. NUM.	AMPERE RATING	CAT. NUM.	REF. NUM.
1A	ACK1	B219421	20A	ACK20	T212767	70A	ACK70	P222630	160A	ACK160	H211216
2A	ACK2	G212250	25A	ACK25	G214297	80A	ACK80	Z201479	175A	ACK175	Y211736
3A	ACK3	J215311	30A	ACK30	M215820	90A	ACK90	J201994	200A	ACK200	G213285
5A	ACK5	Y218383	35A	ACK35	V216839	100A	ACK100	N222629	225A	ACK225	Y213783
6A	ACK6	C219422	40A	ACK40	J217358	120A	ACK120	C223148	250A	ACK250	G214803
10A	ACK10	V219944	50A	ACK50	N218903	140A	ACK140	J200936	300A	ACK300	R216330
15A	ACK15	Y201478	60A	ACK60	W219945	150A	ACK150	H201993	400A	ACK400	R217871

ACL Fuse

AMPERE RATING	CAT. NUM.	REF. NUM.	AMPERE RATING	CAT. NUM.	REF. NUM.
30A	ACL30	H212251	70A	ACL70	H214804
35A	ACL35	V212768	80A	ACL80	N215821
40A	ACL40	H213286	90A	ACL90	S216331
50A	ACL50	Z213784	100A	ACL100	J211217
60A	ACL60	H214298	120A	ACL120	Z211737

ALS Fuse

AMPERE RATING	CAT. NUM.	REF. NUM.	AMPERE RATING	CAT. NUM.	REF. NUM.
100A	ALS100	W216840	300A	ALS300	X219946
150A	ALS150	K217359	350A	ALS350	Q222631
175A	ALS175	S217872	400A	ALS400	E223150
200A	ALS200	Z218384	450A	ALS450	K200937
225A	ALS225	P218904	500A	ALS500	A201480
250A	ALS250	D219423	–	–	–

CNL/CNN:

AMPERE RATING	CATALOG NUMBER		REFERENCE NUMBER		AMPERE RATING	CATALOG NUMBER		REFERENCE NUMBER		AMPERE RATING	CATALOG NUMBER		REFERENCE NUMBER	
10A	-	CNN10	–	R222632	125A	CNL125	CNN125	K211218	K211218	300A	CNL300	CNN300	L215313	B213786
35A	CNL35	CNN35	T216332	K214806	130A	CNL130	-	A211738	–	350A	CNL325	CNN325	P215822	K214300
40A	CNL40	CNN40	L217360	Q215823	150A	CNL150	CNN150	J212252	B201481	400A	CNL350	CNN350	X216841	M215314
50A	CNL50	CNN50	A218385	Y216842	175A	CNL175	CNN175	W212769	L201996	450A	CNL400	CNN400	T217873	V216333
60A	CNL60	CNN60	E219424	V217874	200A	CNL200	CNN200	J213287	B211739	500A	CNL500	CNN500	Q218905	M217361
80A	CNL80	CNN80	Y219947	F219425	225A	CNL225	CNN225	A213785	K212253	600A	-	CNN600	–	B218386
90A	-	CNN90	–	S222633	250A	CNL250	CNN250	J214299	X212770	700A	-	CNN700	–	R218906
100A	CNL100	CNN100	K201995	F223151	275A	CNL275	CNN275	J214805	K213288	800A	-	CNN800	–	Z219948

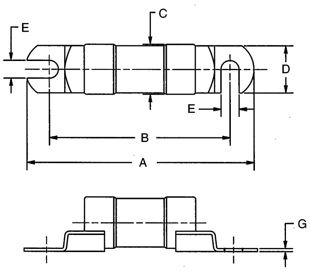


Figure 1

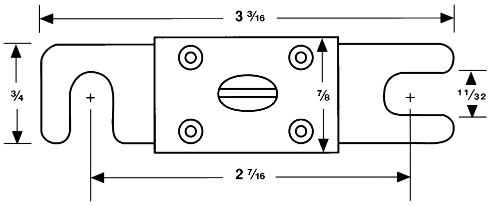


Figure 2

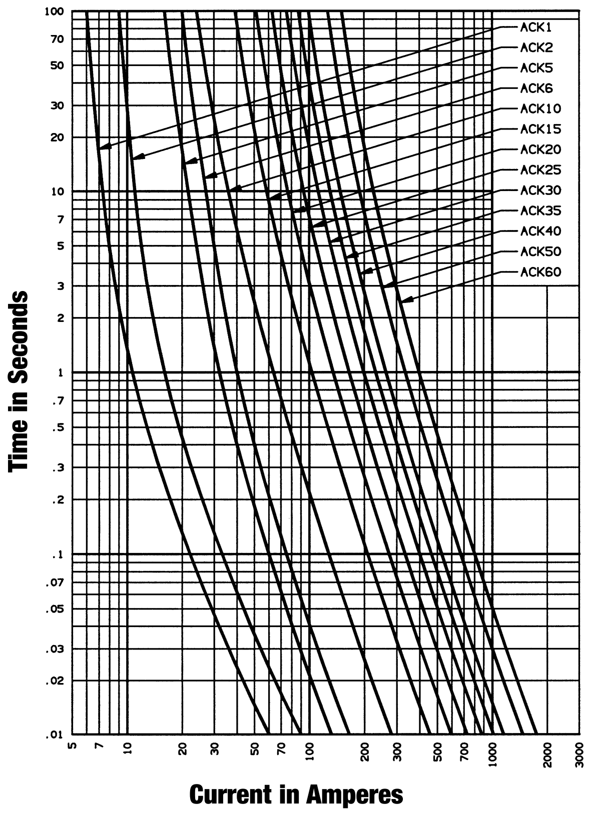
Dimensions

CATALOG NUMBER	OUTLINE FIGURE	A	B	C	D	E	F	G
		In. (mm)	In. (mm)	In. (mm)	In. (mm)	In. (mm)	In. (mm)	In. (mm)
ACK 1-30	1	3.07 (77.9)	2.5 (63.5)	.56 (14.3)	.5 (12.7)	.28 (7.1)	.593 (15)	.03 (.8)
ACK 35-60	1	3.74 (95)	3 (76.2)	.81 (20.6)	.75 (19.1)	.34 (8.7)	.86 (21.8)	.047 (1.2)
ACK 70-100	1	4.46 (113.4)	3.5 (88.9)	1.06 (26.9)	1 (25.4)	.38 (9.5)	1.12 (28.5)	.06 (1.6)
ACK 120-200	1	4.72 (119.8)	3.75 (95.4)	1.06 (26.9)	1 (25.4)	.38 (9.5)	1.12 (28.5)	.06 (1.6)
ACK 225-400	1	4.71 (119.7)	3.75 (95.4)	1.06 (26.9)	1 (25.4)	.38 (9.5)	1.12 (28.5)	.06 (1.6)
ACL 30-60	1	3.07 (77.9)	2.5 (63.5)	.56 (14.3)	.5 (12.7)	.28 (7.1)	.593 (15)	.03 (.8)
ACL 70-120	1	3.49 (88.6)	2.75 (69.9)	.81 (20.6)	.75 (19.1)	.34 (8.7)	.86 (21.8)	.047 (1.2)
ALS 100-500	1	4.71 (119.7)	3.75 (95.4)	1.06 (26.9)	1 (25.4)	.38 (9.5)	1.12 (28.5)	.06 (1.6)
CNL/CNN	2	–	–	–	–	–	–	–

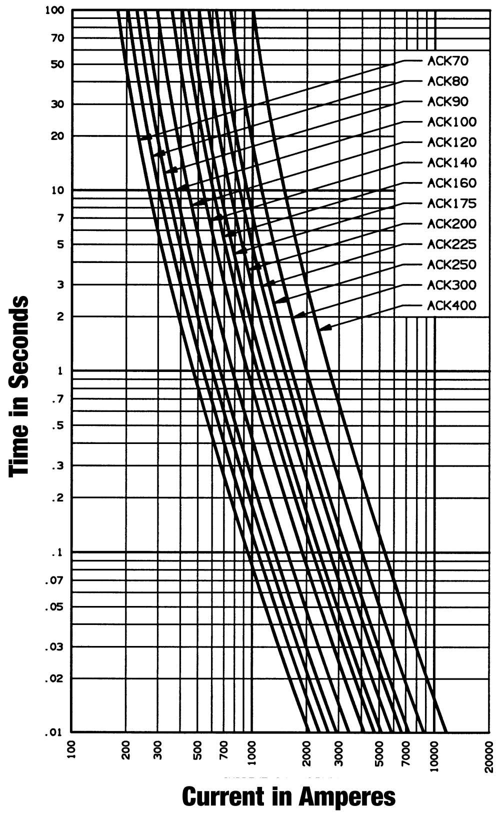
Forklift Fuses

ACK, ACL, ALS, CNN, CNL

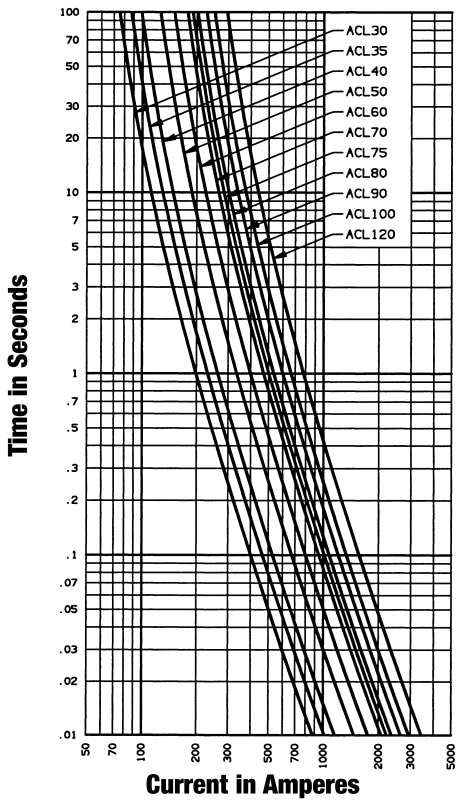
Melting Time – Current Data – ACK1–60



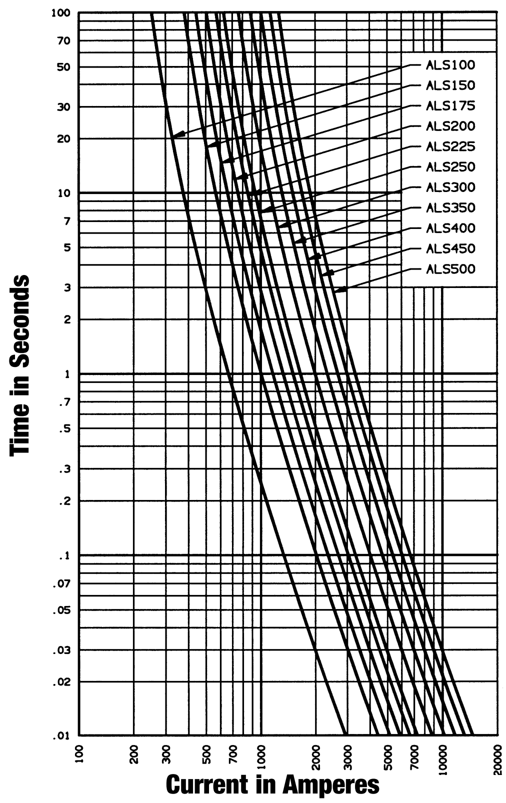
Melting Time – Current Data – ACK70–400



Melting Time – Current Data – ACL30–120

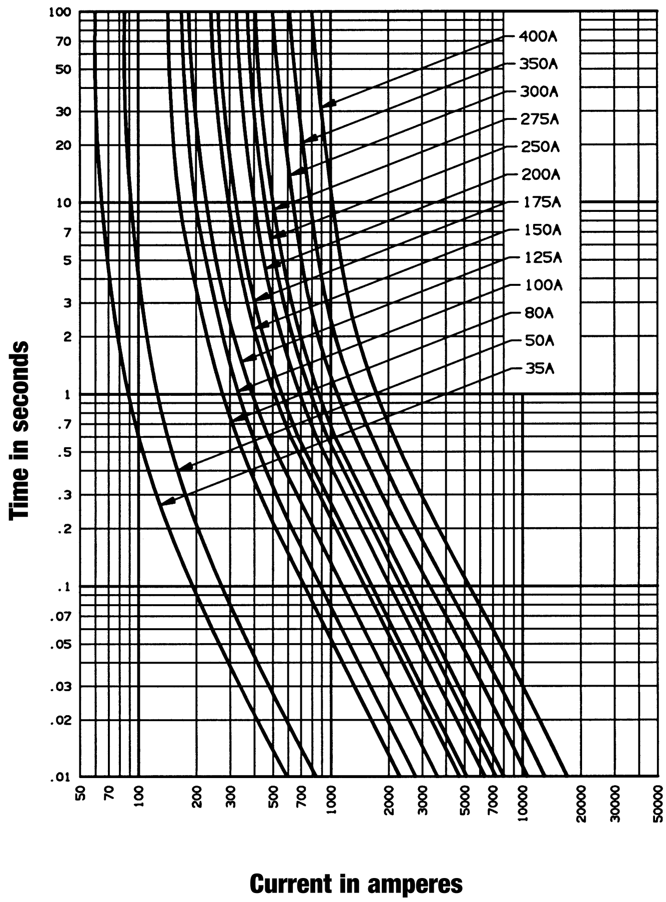


Melting Time – Current Data – ALS100–500

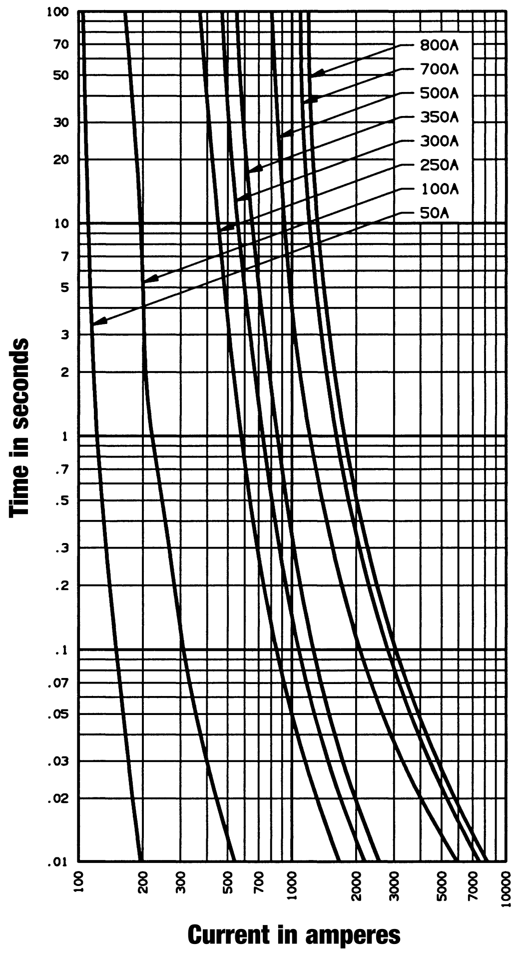


Forklift Fuses — ACK, ACL, ALS, CNN, CNL

Melting Time – Current Data – CNL35–400



Melting Time – Current Data – CNN50–800



Telecommunications Fuses

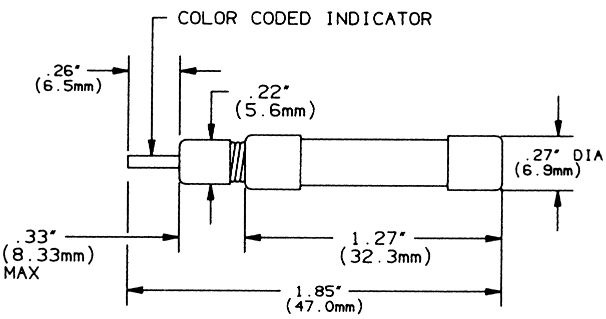


70 SERIES

- ✔ Color Coded tip
- ✔ Rated 125V AC, 300V DC
- ✔ UL Recognized 125 V AC, 1000A I.R.; 300V DC, 1000A I.R. Guide JDYX2, File E39265
- ✔ Continuous rated current is 80% of 10 minute rating (shown in table). 100% rating -10 minutes minimum

70 SERIES ALARM INDICATING TELECOMMUNICATIONS FUSES

Ferraz Shawmut 70 Series Alarm Indicating fuses are used in telecommunications equipment. Each ampere rating has a specific color-coded tip for easy visual identification.



Reference Numbers, Ampere Ratings, Certifications

10 MINUTE AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	COLOR CODE
100mA	70P	G201555	Gray-White
150mA	70R	R203404	Red-White
180mA	70E	Z217947	Yellow
200mA	70X	D211810	Black
250mA	70F	E218458	Violet
250mA	70K	T222703	Violet-White
350mA	70S	T211295	Gray
500mA	70G	X218980	Red
750mA	70H	P219502	Brown
1.33A	70A	R215893	White
2A	70B	W216403	Orange
3A	70C	D216916	Blue
3.5A	70J	L221960	Black-White
5A	70D	R217434	Green-Black
8A	70M	J223223	Tan-White
10A	70N	A201043	Yellow-Purple



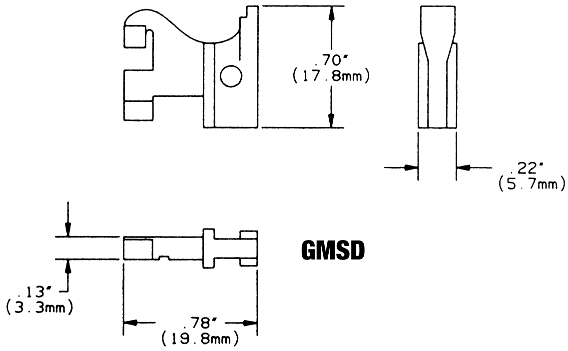
GMS/GMSC/GMSD

- ✔ Safety Covers
- ✔ Color Coded
- ✔ Lubricated
- ✔ Ryton Body Material
- ✔ Rated 125V AC, 125V DC
- ✔ UL Recognized 125 V AC, 300A I.R.; 125V DC, 300A I.R. Guide JDYX2, File E39265
- ✔ Carry 100% load - 10 minutes, min. clear 150% load - 5 minutes, max.

GMS SERIES ALARM INDICATING TELECOMMUNICATIONS FUSES

Ferraz Shawmut GMS Series Alarm Indicating fuses are used in telecommunications equipment or other applications. A color coded flag indicates a circuit problem which caused the fuse to blow. Nineteen ampere ratings/colors fill every replacement need.

GMS: Alarm indicating telecommunications fuse
GMSC: Safety cover for GMS fuse (not shown)
GMSD: Dummy fuse to protect unused circuits



Reference Numbers, Ampere Ratings, Certifications

AMPERE RATING	CATALOG NUMBER	REFERENCE NUMBER	VOLTS	COLOR CODE
180mA	Z215509	Z215509	125	Yellow
200mA	GMS2/10	S217044	125	Black-Red
250mA	GMS1/4	S212444	125	Violet
500mA	GMS1/2	E211926	125	Red
650mA	GMS65/100	F211927	125	Black
750mA	GMS3/4	N218581	125	Brown
1A	GMS1	L201674	125	Gray
1.33A	GMS1-1/3	C211418	125	White
1.5A	GMS1-1/2	V205477	125	White-Yellow
2A	GMS2	G216022	125	Orange
2.5A	GMS2-1/2	C216524	125	White-Orange
3A	GMS3	C217559	125	Blue
3.5A	GMS3-1/2	J218071	125	White-Blue
4A	GMS4	B219628	125	White-Brown
5A	GMS5	R222080	125	Green
7.5A	GMS7-1/2	T212445	125	Black-White
10A	GMS10	C212959	125	Red-White
12A	GMS12	G213975	125	Yellow-Green
15A	GMS15	S214491	125	Red-Blue

Special Purpose Fuses

European

Residential Fuses gF

Reference Numbers, Ratings – gF (Optional Blown-Fuse Indicator)

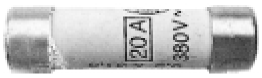
SIZE (mm x mm)	RATED In CURRENT (A)	RATED VOLTAGE	CATALOG NUMBER w/o Indicator	CATALOG NUMBER w/Indicator	REFERENCE NUMBER w/o Indicator	REFERENCE NUMBER w/Indicator	INTERRUPTING RATING (A)	STANDARD PACK/CTN.
6.3 x 23	2 4 6 10	250V	10013 10019 10023 10031	- - - -	N213590 Q214098 T214607 D215628	- - - -	6kA - 250V	10
8.5 X 23	2 4 6 10 15	250V	10213 10219 10223 10231 10235	12213 12219 12223 12231 12235	K216140 H216644 V217161 J218186 K219222	N211543 V212055 M212577 X213092 Q213592	6kA - 250V	10
10.3 X 25.8	6 10 16	250V	10423 10431 10435	12423 12431 12435	M219753 V222198 Q222953	S214100 W214609 D215122	6kA - 250V	10
8.5 x 31.5	0.5 1 2 4 6 8 10 12 16 20 25	380V	10609 10611 10613 10619 10623 10627 10631 10633 10635 10637 10639	12609 12611 12613 12619 12623 12627 12631 12633 12635 12637 12639	N201285 Y201800 V211020 M211542 T212054 L212576 W213091 P213591 R214099 V214608 E215629	F215630 M216142 K216646 X217163 B217673 L218188 Z218706 M219224 X222200 B200745 Q201287	20kA - 400V	10
10.3 x 31.5	16 20 25	380V	10835 10837 10839	12835 12837 12839	L216141 J216645 W217162	A201802 X211022 P211544	20kA - 400V	10
8.5 x 36	2 4 6 10 16 20 25 32	380V	11013 11019 11023 11031 11035 11037 11039 11043	13013 13019 13023 13031 13035 13037 13039 13043	A217672 K218187 Y218705 L219223 N219754 W222199 R222954 A200744	N212578 Y213093 R213593 T214101 X214610 E215123 G215631 N216143	20kA - 400V	10
10.3 x 38	25 32	380V	11239 11243	13239 13243	P201286 Z201801	L216647 Y217164	20kA - 400V	10



D215628



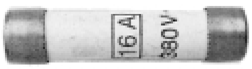
K219222



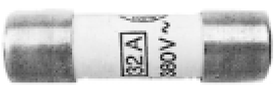
V214608



W217162

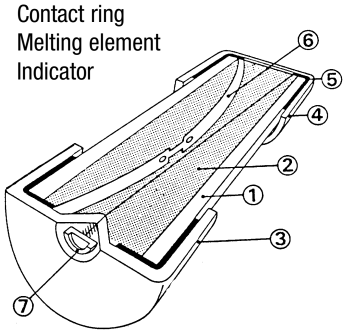


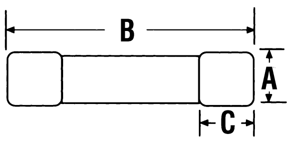
N219754



Z201801

1 Ceramic body
2 Sand
3 Indicator contact
4 Lower contact
5 Contact ring
6 Melting element
7 Indicator

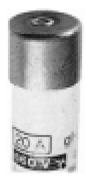




Dimensions

FUSE SIZE (mm x mm)	A	B	C
6.3 X 23	6.3	23	5
8.5 X 23	8.5	23	5
10.3 x 25.8	10.3	25.8	6.3
8.5 x 31.5	8.5	31.5	6.3
10.3 x 31.5	10.3	31.5	10
8.5 x 36	8.5	36	6.3
10.3 x 38	10.3	38	10

Blown-Fuse Indicator



BEFORE



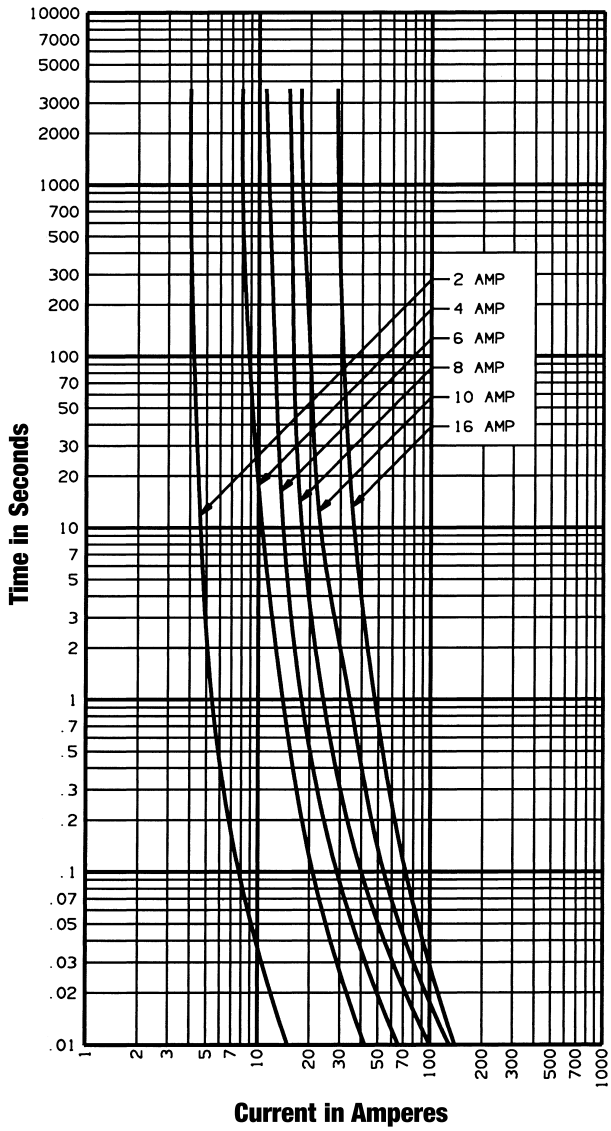
AFTER

Ferraz Shawmut

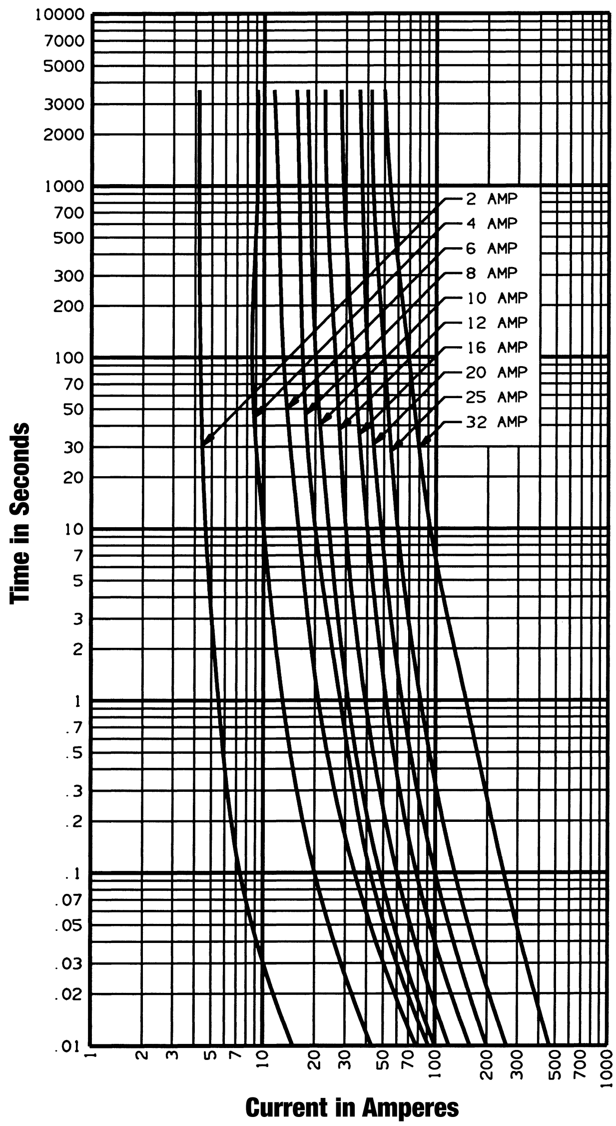
Residential Fuses

gF

Melting Time - Current Data – 2-16 Amperes, 250V



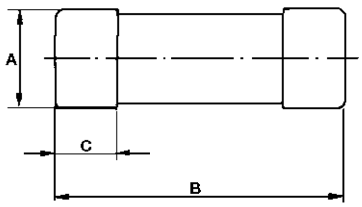
Melting Time - Current Data – 2-32 Amperes, 380V



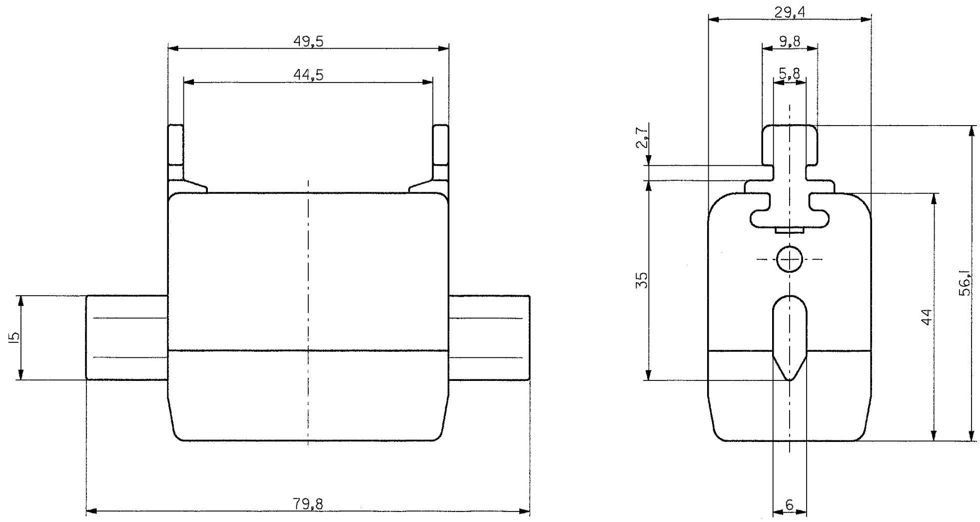
Special Purpose Fuses

European

Residential Fuses AD



	10 x 38	14 x 51	22 x 58
A	10,3	14,3	22,2
B	38	51	58
C	10,5	13,8	16,2



AD: In max: 90A; Vn max: 440V



K201305



P223435

Size	In (A)	CAT. NUM.	REF. NUM.	Icc-Vn	Pack.
10 x 38	AD 15	16134	V216149	20KA-440V	10
14 x 51	AD 15 AD 30	17134 17141	E222966 M200755	32KA-440V 32KA-440V	10
22 x 58	AD 15 AD 30 AD 45 AD 60	18134 18141 18149 18153	M222973 V200762 K201305 T201819	32KA-440V	10
00	AD 15 AD 30 AD 45 AD 60 AD 90	37134 37141 37149 37153 37161	- - J223430 P223435 X223442	32KA-440V	10
Neutral					
10 x 38 14 x 51 22 x 58		19100 19200J 19300	R211569 M212600J R213616		10
00		45002	Z218269		10

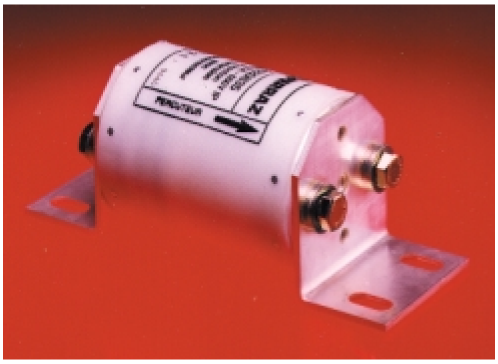
Fuse-size 2 EDF

Standards: NFC 62921, IEC 269-2-1

Surge Suppression Fuses PAV

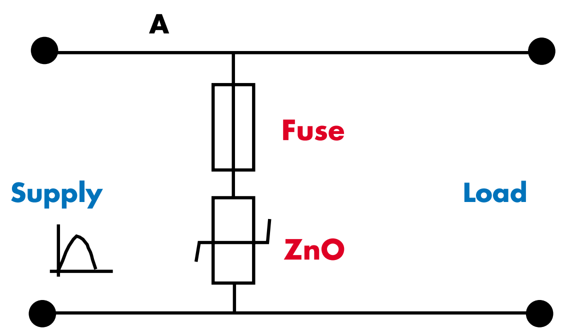
PROTECTION AGAINST LOW VOLTAGE ARRESTER FAILURE

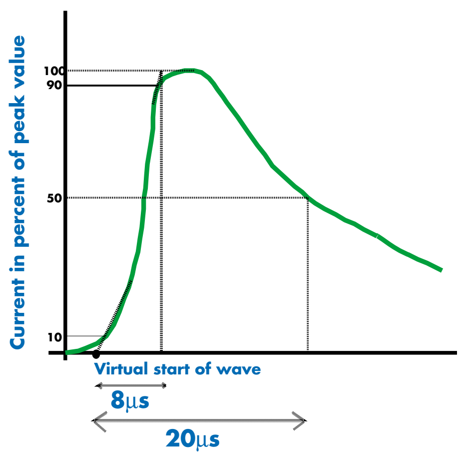
- WHEN AN ARRESTER FAILS (IT CAN NO LONGER CONTAIN OVERVOLTAGE AND THUS SHORT CIRCUITS), A FUSE IS NEEDED TO PREVENT ITS EXPLOSION. IF THE FUSE IS EQUIPPED WITH A TRIP-INDICATOR, THE USER WILL BE AWARE THAT THE ARRESTER MUST BE REPLACED.



- SIMILAR STANDARDS EXIST IN MANY OTHER COUNTRIES
- AN INTEGRATED ARRESTER/FUSE SYSTEM. ITS NAME, P.A.V. (PROTECTION AMPERE VOLT) WHICH MATCHES THE ABOVE STANDARD. IT IS A RATHER CUSTOM MADE PRODUCT.
- IN ORDER TO MATCH A WIDER MARKET DEMAND, FERRAZ-SHAWMUT ALSO OFFERS THE FUSE ALONE PLUS ITS CORRESPONDING ACCESSORIES, HOLDER AND MICROSWITCH WHICH ALLOWS A REMOTE SIGNALLING. THE ATTACHED LIST PROVIDES A SELECTION OF "ISOLATING FUSES" ABLE TO WITHSTAND ONCE THE MAX PEAK PERMISSIBLE CURRENT IMAX. AS A MATTER OF PRINCIPLE THE SELECTED FUSE AUTOMATICALLY WITHSTANDS 20 TIMES THE LOWER PEAK CURRENT I20 (AND 3 TIMES THE I3, FORMER LOWER PEAK CURRENT IN OLD STANDARDS).

Protection circuit





Definition of the standard 8/20µs wave

Sometimes the fuse could also be located in A. In this case verify that the load current is compatible with the fuse current rating.

Publication: G600375-07/96
RA 0195A

Surge Suppression Fuses PAV

ISOLATING FUSE LIST

Imax (kA) one pulse	Catalog Number	Reference Number	Voltage rating (V)	Current rating (A)	Breaking capacity
1	250V FC 5x20 - 6,3A	E 205 785	250	6.3	250V-6kA
1	′	Z 205 044	250	6.3	250V-6kA
2.5	250V FC 5x20 - 10A	T 205 683	250	10	250V-6kA
2.5	′	B 205 046	250	10	250V-6kA
3	250V SA 6x32 - 20A	J 084 418	250	20	250V-200kA
4.5	gG 10-20A	L 094 241	500	20	500V-100kA
4.5	6,921 Cp gRC 14x51-50A	N 220 950	690	50	690V-300kA
5	gG 20-25	M 094 242	400	25	400V-100kA
5	621 Cp URC 14x51-63A	V 220 910	600	63	600V-100kA
6.5	gG 10-32	B 094 232	400	32	400V-100kA
6.5	6,921 Cp gRC 22x58-80	X 220 820	690	80	690V-300kA
8-10	gG 14-32	P 093 393	500	32	500V-100kA
8-10	521 Cp gG 14-32	L 094 494	500	32	500V-100kA
8-10	6,921 Cp gRC 22x58-100	C 220 917	690	100	690V-300kA
15	gG 14-40	Q 093 394	500	40	500V-100kA
15	521 Cp gG 14-40	N 094 496	500	40	500V-100kA
15	621 Cp URD 22x58-135	B 220 709	600	135	600V-300kA
20	gG 22-63	Y 094 781	500	63	500V-100kA
20	gG 22-63 MR	J 205 651	690	63	690V-100kA
20	521 Cp gG 22-63	Z 094 667	500	63	500V-100kA
25	gG 22-80	A 094 783	500	80	500V-100kA
25	gG 22-80 MR	K 205 652	690	80	690V-100kA
25	521 Cp gG 22-80	A 094 668	500	80	500V-100kA
35-40	gG 22-100	H 094 767	500	100	500V-100kA
35-40	521 Cp gG 22-100	V 093 743	500	100	500V-100kA
50-60	gG 22-125	J 094 584	400	125	400V-100kA
50-60	421 Cp gG 22-125	V 093 743	400	125	400V-100kA
65	gG 00 L 160	D 098 305	500	160	500V-100kA
65	gG 1/160 P	G 095 594	500	160	500V-100kA
65	6,9P C5 gG 1 P 160	G 084 692	690	160	660V-200kA
75-100	gG 0 L/200	H 095 020	500	200	500V-100kA
75-100	gG 1/200P	H 095 595	500	200	500V-100kA
75-100	6,9P C5 gG 1 P 200	F 084 691	690	200	660V-200kA
75-100	6,6 URD 32 TTF 0900	Q 300 072	660	900	660V-200kA
75-100	6,6 URD 32 D11A 0900	X 300 193	660	900	660V-200kA
120	gG 1 L/250	Z 095 035	500	250	500V-100kA
120	gG 1/250 P	K 095 597	500	250	500V-100kA
120	6,9P C5 gG 2 P 250	G 086 486	690	250	660V-200kA
120	6,6 URD 32 TTF 1000	S 300 074	660	1,000	660V-200kA
120	6,6 URD 32 D11A 1000	Y 300 194	660	1,000	660V-200kA

Rotating Fuses

Global Market Specialty C1G



Ferraz Shawmut rotating fuses are specially designed for withstanding very high mechanical accelerations, up to 6000g. They are perfectly suited to protecting rectifying diodes used in rotating excitors of power producing alternators. Ferraz Shawmut provides every type of mechanical connection required by worldwide manufacturers of rotating excitors.

Voltage	Ratings
300 V	200 to 550 A
400 V	1000 A
500 V	400 A
600 V	250 A to 950 A
700 V	400 A to 950 A
750 V	610 A to 800 A
800 V	500 A to 1200 A
850 V	500 A to 1340 A
1000 V	15 A to 400 A

Ask us for further details

Features / Benefits

- Glass fiber body for reinforced mechanical withstand and stable dimensions.
- Internal reinforcement by alumina spacer for withstanding very high accelerations.
- Fuse elements are selected to comply with different turbogenerator applications (DSS - WSS - MSS).

Fuse Blocks & Fuse Holders

North American Power Fuses

Midget Fuses

French Ferrule Fuses

NH Fuses

DIN Fuses

DIN/NH Fuses

Miniature Fuses

Semiconductor Fuses

Medium Voltage Fuses

Ferraz Shawmut

UltraSafe J

US3J, US6J



ULTRASAFE™ MODULAR FUSE HOLDERS FOR CLASS J FUSES

Ferraz Shawmut ULTRASAFE™ modular 600 volt Fuse Holders for Class J fuses introduce a new level of safety and ease for installing or replacing Class J fuses. ULTRASAFE holders qualify as "finger safe" to an IP2 grade of protection under IEC standards. The US3J accommodates 30A Class J or 22 x 58 mm French Ferrule* fuses. The US6J is for 60A Class J fuses. ULTRASAFE holders are available in compact 1, 2, or 3 pole units, with or without blown-fuse indicators in each pole. Multi-pole units can also be made up in the field by using the multiple-pole Assembly Kits.

All units have provisions for locking in the open position for safety during fuse changeouts or equipment servicing. US3J and US6J holders can be snap-mounted to 35 mm DIN rail and they have a unique latch which will stay open to allow re-positioning of the holder in the future. ULTRASAFE body material is tough and durable polyamide.

*Holder not UL listed with these fuses

HIGHLIGHTS:

- ✔ Finger Safe
- ✔ Optional Indicator Lights
- ✔ DIN Rail Mount
- ✔ Compact Footprint
- ✔ Quick, Easy Fuse Change

APPLICATIONS:

- ✔ 600 volt motors, transformers, lighting, heating, control circuits, general loads
- ✔ Non-load disconnect

Ratings

- ✔ 600VAC: 30A & 60A
- ✔ Withstand rating: 200kA I.R.
- ✔ Min. voltage to operate indicator light: 90VAC, 115VDC [Less than 0.7 mA leakage current at 600V]

Approvals

- ✔ All ULTRASAFE Fuse Holders meet the requirements of UL512
- ✔ UL Listed Guide IZLT, File E52283
- ✔ CSA Certified Class 6225 File 32169

RECOMMENDED FUSE USAGE

US3J, US6J . . . . .use with **AJT, A4J**

UltraSafe J — US3J, US6J

Catalog and Reference Numbers & Descriptions – For use with 30A Class J Fuses

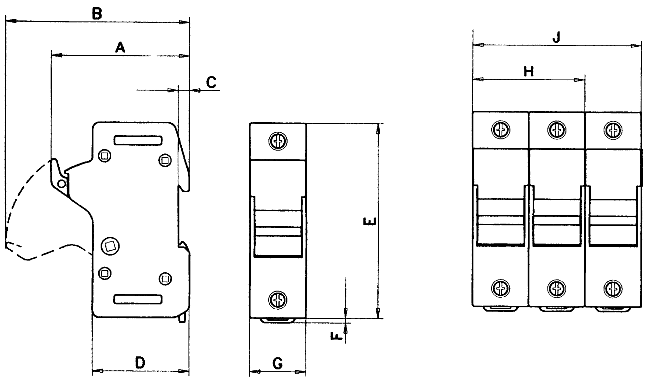
CAT. NUMBER	REF. NUMBER	DESCRIPTION
US3J1	E212409	1 Pole
US3J2	A213440	2 Pole
US3J3	J214460	3 Pole
US3J1I	M212922	1 Pole with Indicator
US3J2I	W213942	2 Pole with Indicators
US3J3I	K214967	3 Pole with Indicators
US3JN	N215476	1 Pole - Neutral
US3J2PAK	R215985	2 Pole Assembling Kit
US3J3PAK	C217007	3 Pole Assembling Kit
US3J4PAK	X218037	4 Pole Assembling Kit

Catalog and Reference Numbers & Descriptions – For use with 60A Class J Fuses

CAT. NUMBER	REF. NUMBER	DESCRIPTION
US6J1	M219592	1 Pole
US6J2	P222791	2 Pole
US6J3	V205017	3 Pole
US6J1I	F222047	1 Pole with Indicator
US6J2I	D223310	2 Pole with Indicators
US6J3I	M211381	3 Pole with Indicators
US6JN	N212923	1 Pole - Neutral
US6J2PAK	T201129	2 Pole Assembling Kit
US6J3PAK	T211893	3 Pole Assembling Kit
US6J4PAK	F212410	4 Pole Assembling Kit

Dimensions

DIMENSION	US3J		US6J	
	mm	In	mm	In
A	80	3.15	89	3.50
B	106	4.17	115	4.53
C	6.5	0.26	6.5	0.26
D	56	2.20	62	2.44
E	114	4.49	122	4.80
F	3	0.12	3	0.12
G	32.5	1.28	40	1.57
H	65	2.56	80	3.15
J	97.5	3.84	120	4.72



Terminal screws: Phillips/slot head
Suggested screw torque: 30A - 35 in-lbs. (4 N.m)
60A - 45 in-lbs. (5.2 N.m)
Connector type: Pressure plate
Wire range: #2 to #14 (solid/stranded Cu)
Load-break disconnect: No

Cylindrical & Blade Fuse Blocks Class J



CLASS J FUSE BLOCKS

Ferraz Shawmut Class J Fuse Blocks accommodate all Class J fuses. A choice of screw, pressure plate, box and special order stud connectors fit a wide range of stranded or solid copper or aluminum wire. Insulators are either molded glass-filled polycarbonate (GFPC) or phenolic with verified dielectric strength in excess of 2500V. 30 and 60A fuse blocks feature a unique adder block which can be snapped onto 1-, 2- or 3-pole blocks to form multi-pole segmented blocks of as many poles as desired. All fuse clips are made of high conductivity tin-plated copper, with a choice of spring reinforced or non-spring reinforced clips in 30A and 60A. Clips 100A and above are spring reinforced.

Ratings

- ✔ 600VAC:
  30A, 60A, 100A,
  200A, 400A, 600A
- ✔ Withstand rating:
  200kA

Approvals

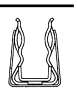
- ✔ All fuse blocks meet the requirements of UL Std. 512
- ✔ UL Listed,
  Guide IZLT, File E52283
- ✔ CSA Certified
  Class 6225, File 32169

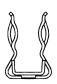
RECOMMENDED FUSE USAGE

Class J Blocks (600V) . . . . . . .use with **AJT, A4J**

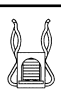
Clip & Connector Types

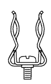
30A & 60A CLIPS

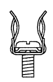
SPRING REINFORCED 

NON-SPRING REINFORCED 

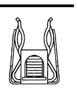
CONNECTORS

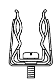
NON-SPRING REINFORCED: 30A & 60A BOX 

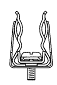
30A SCREW 

30A PRESSURE PLATE 

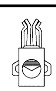
CONNECTORS

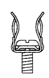
SPRING REINFORCED: 30A & 60A BOX 

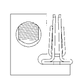
30A SCREW 

30A PRESSURE PLATE 

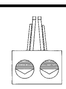
CONNECTORS

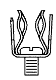
SPRING REINFORCED: 100A BOX 

200A BOX SIDE-CLIP 

400A BOX SIDE-CLIP 

CONNECTORS

SPRING REINFORCED: 400A BOX IN-LINE CLIP 

600A BOX IN-LINE CLIP 

Cylindrical & Blade Fuse Blocks — Class J

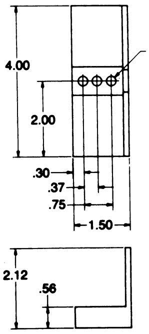


Figure 1

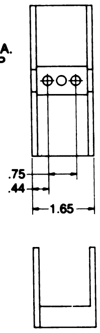


Figure 2

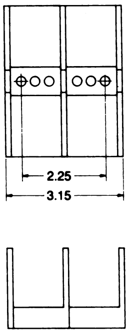


Figure 3

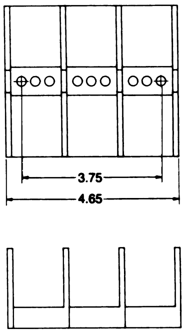


Figure 4

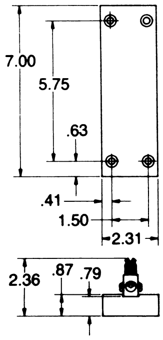


Figure 5

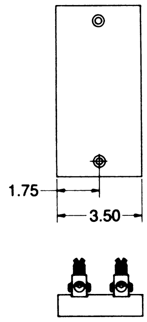


Figure 6

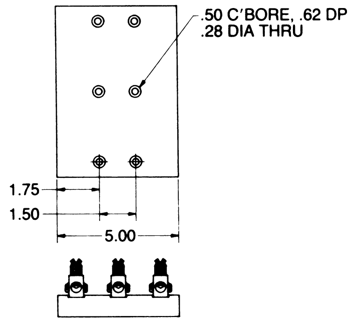


Figure 7

30A and 100A figures are standard dimension fuse blocks. See also 30 A and 100A space-saving "SJ" Series.

Recommended mounting screws for all 30A, 60A and 100A fuse blocks: 1/4" (.250" dia.)

600 Volt, 30, 60 & 100 Ampere Class J Fuse Blocks

AMPERE RATING	POLES	CONNECTOR		CATALOG NUMBER TYPE OF CLIP		REFERENCE NUMBER TYPE OF CLIP		FIG.	CONNECTOR TORQUE In - lb
		TYPE	WIRE RANGE	NON-SPRING REINFORCED	SPRING REINFORCED	NON-SPRING REINFORCED	SPRING REINFORCED		
30 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	60300J 60301J 60302J 60303J	60305J 60306J 60307J 60308J	D219584 X222039 T223301 W201637	K204893 J211884 S213433 A214452	1 2 3 4	35
	ADDER 1 2 3	SCREW	Cu #10-14	60310J 60311J 60312J 60313J	60315J 60316J 60317J 60318J	E215468 H215977 T216999 E217515	N218029 P219065 Y222040 V223302	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE	Cu #10-14	60320J 60321J 60322J 60323J	60325J 60326J 60327J 60328J	X201638 N204896 D211373 K211885	Y212403 T213434 B214453 F215469	1 2 3 4	20
	ADDER 1 2 3	BOX	Cu* #4-14	- - - -	60355J 60356J 60357J 60358J	- - - -	G216482 P218030 Q219066 Z222041	1 2 3 4	35
60 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	60600J 60601J 60602J 60603J	60605J 60606J 60607J 60608J	W223303 M201123 Y201639 R204899	E211374 L211886 Z212404 F212916	1 2 3 4	45
	ADDER 1 2 3	BOX	Cu* #4-14	- - - -	60655J 60656J 60657J 60658J	- - - -	G215470 K215979 H216483 W217001	1 2 3 4	45
100 PHENOLIC INSULATOR	1 2 3	BOX	Al/Cu 2/0-#6	- - -	61036J 61037J 61038J	- - -	Z201640 F211375 G212917	5 6 7	120
	1 2 3	BOX	Cu* 2/0-#12	- - -	61006J 61007J 61008J	- - -	F217516 Q218031 W218542	5 6 7	50

Note:
To convert 30A or 60A adder pole to single pole, use end barrier #U09617. *Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks — Class J

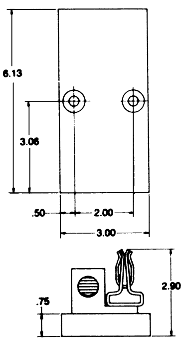


Figure 1

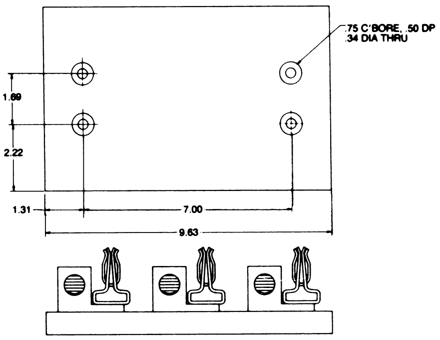


Figure 2

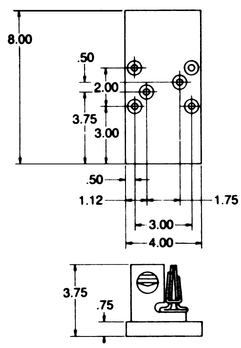


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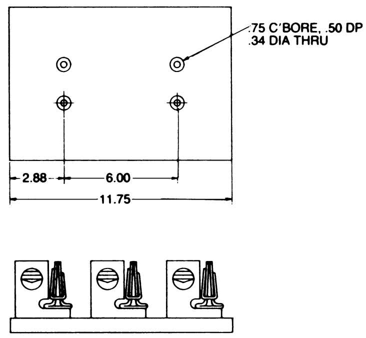


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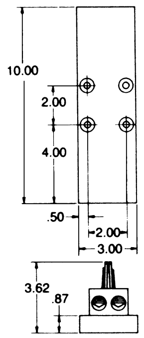


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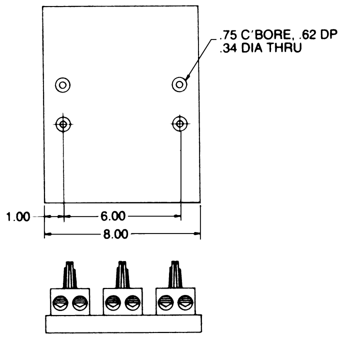


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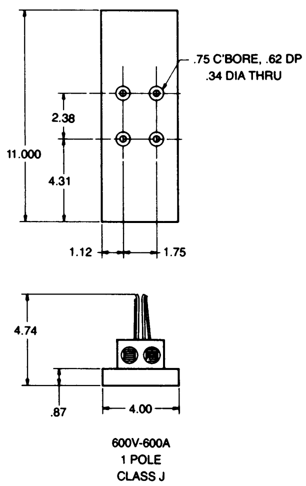


Figure 7

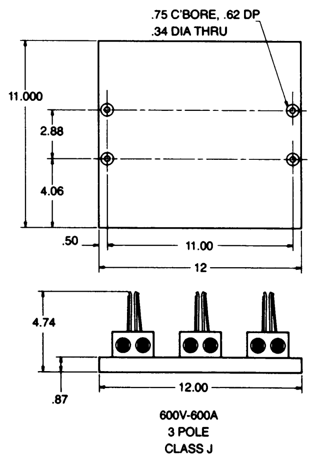


Figure 8

Recommended mounting screws:

All 200A, 400A & 600A - 5/16" (.313" dia.)

600 Volt, 200, 400 & 600 Ampere Class J Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CAT. NUMBER SPRING REINFORCED	REF. NUMBER SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
200 PHENOLIC INSULATOR	1 3	BOX SIDE-CLIP	Al/Cu 350kcmil-#6	62001J 62003J	D214455 E214962	1 2	375
	1 3	BOX SIDE-CLIP	Cu** 350kcmil-#6	62051J 62053J	J216484 X217002	1 2	275
400 PHENOLIC INSULATOR	1 3	BOX* SIDE-CLIP	AL/Cu 1000-250kcmil	64001J 64003J	G217517 R218032	3 4	375
	1 3	BOX IN-LINE CLIP	AL/Cu (2) 350kcmil-#4	64031J 64033J	X218543 S219068	5 6	275
	1 3	BOX* SIDE-CLIP	Cu** 1000-250kcmil	64051J 64053J	G219587 A222042	3 4	375
	1 3	BOX IN-LINE CLIP	Cu** (2) 350kcmil-#6	64061J 64063J	J222786 Y223305	5 6	275
600 PHENOLIC INSULATOR	1 3	BOX IN-LINE CLIP	Al/Cu (2) 500kcmil-#4	6631J 6633J	P201125 A201641	7 8	500
	1 3	BOX IN-LINE CLIP	Cu** (2) 500kcmil-#4	6661J 6663J	J204984 G211376	7 8	375

* Not UL Listed or CSA Certified

** Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks — Class SJ



SPACE-SAVING "SJ" FUSE BLOCKS

Ferraz Shawmut "SJ" Series Fuse Blocks rated 30A and 100A accommodate all 30A and 100A Class J fuses and occupy approximately 25% less mounting space than standard Class J fuse blocks. A patented built-in DIN rail adapter on the 30 ampere SJ block adds further design versatility. A choice of box, screw, or pressure plate connectors fit a wide range of stranded or solid copper or aluminum wire. Insulators are glass-filled polycarbonate with verified dielectric strength in excess of 2500V. The 30 ampere SJ block features a unique adder block which can be snapped onto 1-, 2- or 3-pole blocks to form multi-pole segmented blocks of as many poles as desired. 100A SJ blocks can also be snapped to each other to form multi-poles. All fuse clips are spring reinforced, made of high conductivity tin-plated copper.

RECOMMENDED FUSE USAGE

Class J Blocks (600V) . . . . use with **AJT, A4J**

Ratings

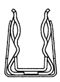
- ✔ 600VAC: 30A, 100A
- ✔ Withstand rating: 200kA

Approvals

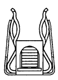
- ✔ All fuse blocks meet the requirements of UL Std. 512
- ✔ UL Listed, Guide IZLT, File E52283
- ✔ CSA Certified Class 6225, File 32169

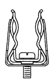
Clip & Connector Types

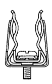
30A CLIP

SPRING REINFORCED 

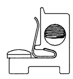
30A CONNECTORS

SPRING REINFORCED: BOX 

SCREW 

PRESSURE PLATE 

100A CONNECTOR

SIDE CLIP 

Cylindrical & Blade Fuse Blocks — Class SJ

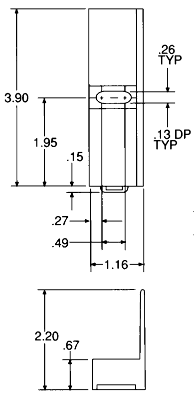


Figure 1

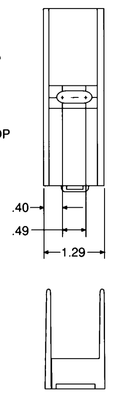


Figure 2

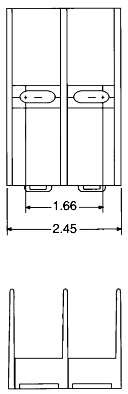


Figure 3

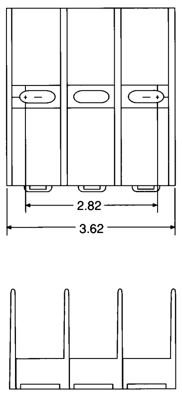


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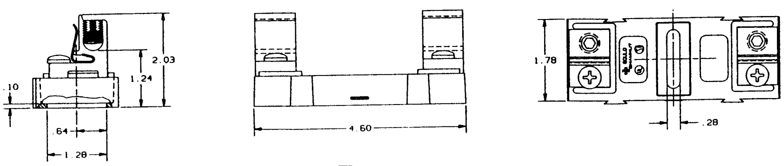


Figure 5

Figure 6

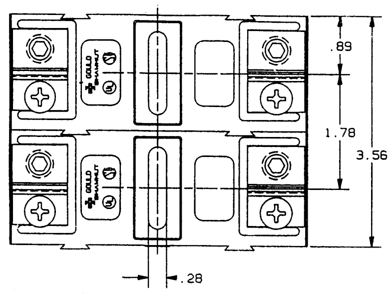
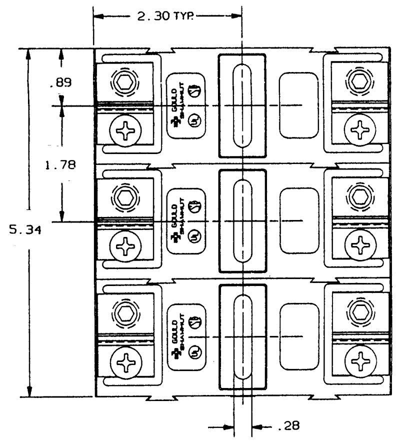


Figure 7



Recommended mounting screws for 30A and 100A fuse blocks: 1/4" (.250" dia.)

600 Volt, 30A & 100A Class J Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER	REFERENCE NUMBER	CONNECTOR FIG.	TORQUE In - lb
30 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	60305SJ 60306SJ 60307SJ 60308SJ	C211372 X212402 M213934 B214959	1 2 3 4	35
	ADDER 1 2 3	SCREW	Cu #10-14	60315SJ 60316SJ 60317SJ 60318SJ	T218540 E219585 G222784 L201122	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE	Cu #10-14	60325SJ 60326SJ 60327SJ 60328SJ	E212915 N213935 C214960 J215978	1 2 3 4	20
	ADDER 1 2 3	BOX	Cu* #4-14	60355SJ 60356SJ 60357SJ 60358SJ	V217000 V218541 F219586 H222785	1 2 3 4	35
100 GFPC INSULATOR	1 2 3	BOX SIDE CLIP	Al/Cu 2/0-#6	61036SJ 61037SJ 61038SJ	B204954 M211887 Q213937	5 6 7	120

Note: To convert 30A "SJ" adder pole to single pole, use end barrier #U09372.

* Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks Class H, K & R



CLASS H, K AND R FUSE BLOCKS

Ferraz Shawmut Class H, K and R Fuse Blocks accommodate all Class H, K and R 250 and 600V power fuses. A choice of screw, pressure plate, box and special order stud connectors fit a wide range of stranded or solid copper or aluminum wire. Insulators are either molded glass-filled polycarbonate (GFPC) or phenolic with verified dielectric strength in excess of 2500V. 30, 60 and 100A fuse blocks feature a unique adder block which can be snapped onto 1-, 2- or 3-pole blocks to form multi-pole segmented blocks of as many poles as desired. All fuse clips are made of high conductivity tin-plated copper, with a choice of spring reinforced or non-spring reinforced clips in 30A and 60A. Clips 100A and above are spring reinforced.

Ratings

- ✔ 250VAC: 30A, 60A, 100A, 200A, 400A, 600A
- ✔ 600VAC: 30A, 60A, 100A, 200A, 400A, 600A
- ✔ Withstand ratings: 250 & 600VAC w/classH fuses - 10kA w/classK fuses - 50kA w/classR fuses - 200kA

Approvals

- ✔ All fuse blocks meet the requirements of UL Std. 512
- ✔ UL Listed, Guide IZLT, File E52283
- ✔ UL Recognized Component Guide IZLT2, File E52283
- ✔ CSA Certified Class 6225, File 32169

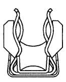
RECOMMENDED FUSE USAGE

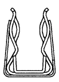
Class R Blocks (250V) . . . . . . .use with **A2D-R, A2K-R, TR-R**
Class R Blocks (600V) . . . . . . .use with **A6D-R, A6K-R, TRS-R**
Class H & K Blocks (250V) . . . .use with **OT, RF, A2Y types 1 & 3 OTN, CRN, NRN**

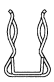
Class H & K Blocks (600V) . . . .use with **OTS, RFS, A6Y types 1 & 3 CRS, NRS**

Clip & Connector Types

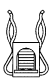
30A & 60A CLIPS

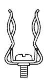
SPRING REINFORCED: CLASS R 

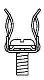
CLASS H & K 

NON-SPRING REINFORCED 

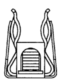
CONNECTORS

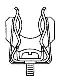
NON-SPRING REINFORCED: 30A & 60A BOX 

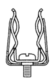
30A SCREW 

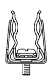
30A PRESSURE PLATE 

CONNECTORS

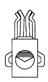
SPRING REINFORCED: 30A & 60A BOX 

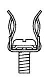
30A SCREW (R) 

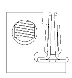
30A SCREW 

30A PRESSURE PLATE 

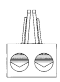
CONNECTORS

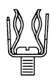
SPRING REINFORCED: 100A BOX 

200A BOX SIDE-CLIP 

400A BOX SIDE-CLIP 

CONNECTORS

SPRING REINFORCED: 400A BOX IN-LINE CLIP 

600A BOX IN-LINE CLIP 

Blocks & Holders

North American Power Fuses

Cylindrical & Blade Fuse Blocks Class H, K & R

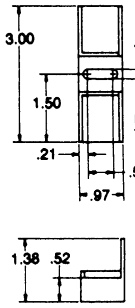


Figure 1

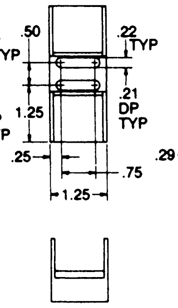


Figure 2

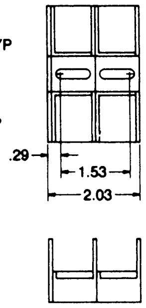


Figure 3

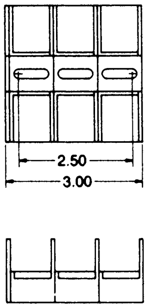


Figure 4

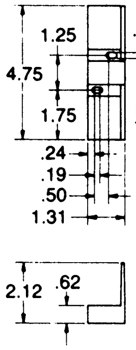


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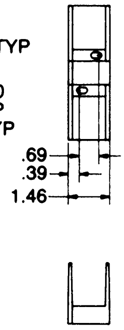


Figure 6

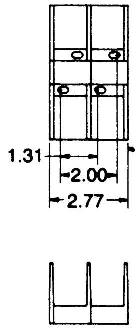


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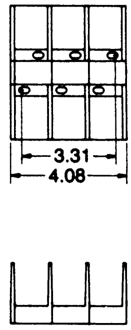


Figure 8

Recommended mounting screws for all 30A and 60A fuse blocks: #10 (.190" dia.)

250 Volt, 30 & 60 Ampere Class H, K and R Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER – TYPE OF CLIP: CLASS H & K NON-SPRING REINFORCED	CATALOG NUMBER – TYPE OF CLIP: CLASS H & K SPRING REINFORCED	CATALOG NUMBER – TYPE OF CLIP: CLASS R SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS H & K NON-SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS H & K SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS R SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
30 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	20300 20301* 20302 20303	20305 20306* 20307 20308	20305R 20306R* 20307R 20308R	Y223282 N201101* Z201617 C204702	E211351 Z212381* A214429 F215446	L211863 T213411* C214937 K215956	1 2 3 4	35
	ADDER 1 2 3	SCREW	Cu #10-14	20310 20311* 20312 20313	20315 20316* 20317 20318	20315R 20316R* 20317R 20318R	K216462 V216977* G217494 P218007	V218518 E219562* K222764 P201102	P219042 Z222018* Z223283 A201618	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE	Cu #10-14	20320 20321* 20322 20323	20325 20326* 20327 20328	20325R 20326R* 20327R 20328R	L204710 F211352* M211864 -	- V213412* - D214938	A212382 N213912* B214430 L215957	1 2 3 4	20
	ADDER 1 2 3	BOX	Cu** #4-14	- - - -	20355 20356* 20357 20358	20355R 20356R* 20357R 20358R	- - - -	L216463 H217495* W218519 F219563	W216978 Q218008* Q219043 A222019	1 2 3 4	35
60 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	20600 20601 20602 20603	20605 20606 20607 20608	20605R 20606R 20607R 20608R	L222765 A223284 Q201103 B201619	L204756 N211865 W213413 C214431	G211353 B212383 P213913 E214939	5 6 7 8	45
	ADDER 1 2 3	BOX	Cu** #4-14	- - - -	20655 20656 20657 20658	20655R 20656R 20657R 20658R	- - - -	B223285 C201620 H211354 C212384	R201104 M204757 P211866 X213414	5 6 7 8	45

Note: To convert 30A adder pole to single pole, use end barrier #U09322. To convert 60A adder pole to single pole, use end barrier #U09365.

* 1-pole, 30A block does not accept adder pole.

** Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks   Class H, K & R

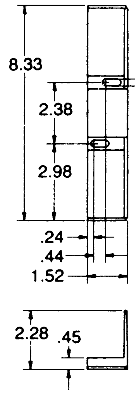


Figure 1

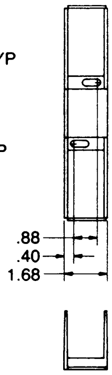


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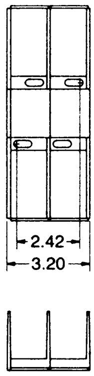


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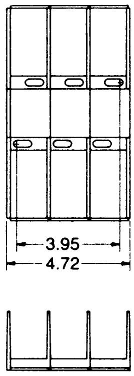


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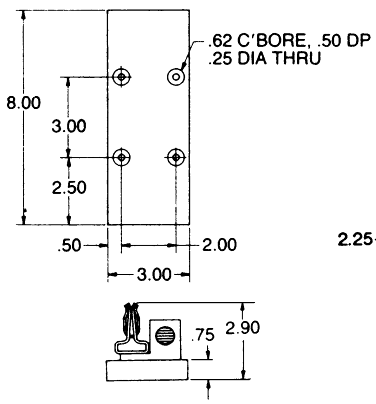


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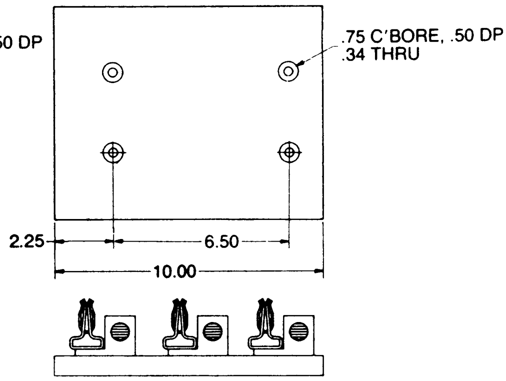


Figure 6

Recommended mounting screws:

All 100A-1/4" (.250" dia.)
200A, 1-pole - #10 (.190" dia.)
200A, 3-pole - 5/16" (.313" dia.)

250 Volt, 100 & 200 Ampere Class H, K and R Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER TYPE OF CLIP CLASS H & K SPRING REINFORCED	CATALOG NUMBER TYPE OF CLIP CLASS R SPRING REINFORCED	REFERENCE NUMBER TYPE OF CLIP CLASS H & K SPRING REINFORCED	REFERENCE NUMBER TYPE OF CLIP CLASS R SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
100 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu 2/0-#6	21035 21036 21037 21038	21035R 21036R 21037R 21038R	N222767 S201105 N204758 Q211867	C223286 D201621 J211355 M212899	1 2 3 4	120
	ADDER 1 2 3	BOX	Cu* 2/0-#12	21005 21006 21007 21008	21005R 21006R 21007R 21008R	Q213914 F214940 M215958 Y216980	D214432 H215448 N216465 J217496	1 2 3 4	50
200 PHENOLIC INSULATOR	1 3	BOX SIDE-CLIP	AL/Cu 350kcmil-#6	22001 22003	22001R 22003R	Y213415 E214433	R213915 G214941	5 6	375
	1 3	BOX SIDE-CLIP	Cu* 350kcmil-#6	220j51 22053	22051R 22053R	- T218011	K217497 Y218521	5 6	275

Note: To convert 100A adder pole to single pole, use end barrier #U09363.

* Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks Class H, K & R

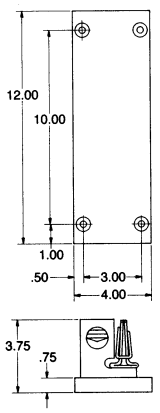


Figure 1

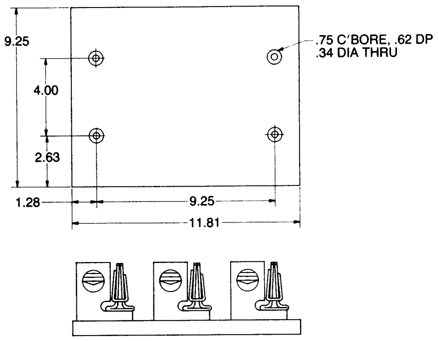


Figure 2

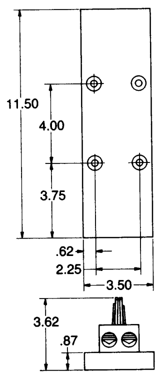


Figure 3

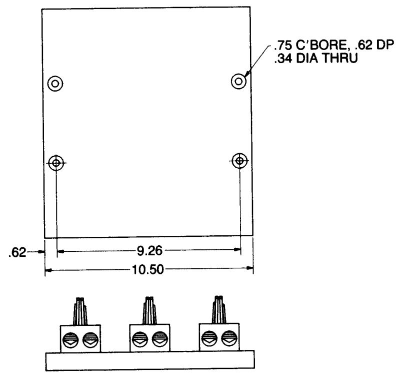


Figure 4

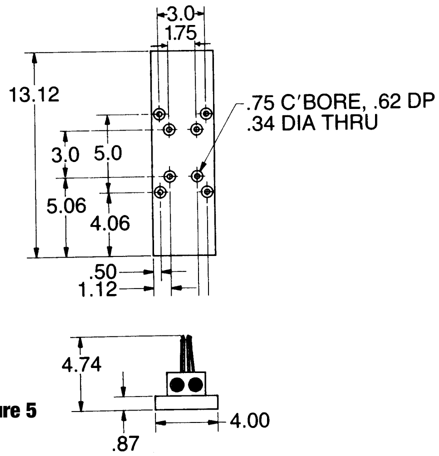


Figure 5

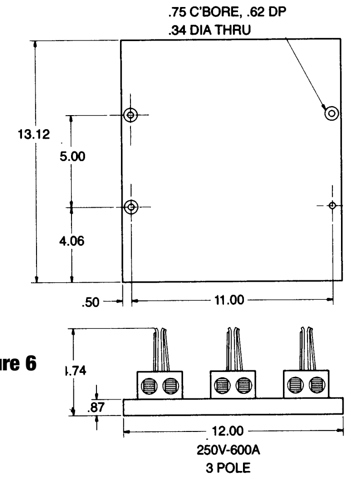


Figure 6

Recommended mounting screws for all 400A and 600A fuse blocks: 5/16 (.313" dia.)

250 Volt, 400 & 600 Ampere Class H, K and R Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER – TYPE OF CLIP: CLASS H & K SPRING REINFORCED	CATALOG NUMBER – TYPE OF CLIP: CLASS R SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS H & K SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS R SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
400 PHENOLIC INSULATOR	1 3	BOX* SIDE-CLIP	Al/Cu 1000-250kcmil	24001 24003	24001R 24003R	T219046 -	J219566 D222022	1 2	375
	1 3	BOX* SIDE-CLIP	Cu** 1000-250kcmil	24051 24053	24051R 24053R	P204759 R211868	K211356 D212385	1 2	375
	1 3	BOX IN-LINE CLIP	AL/Cu (2) 350kcmil-#4	24031 24033	24031R 24033R	P222768 T201106	D223287 E201622	3 4	275
	1 3	BOX IN-LINE CLIP	Cu** (2) 350kcmil-#6	24061 24063	24061R 24063R	- -	N212900 Z213416	3 4	275
600 PHENOLIC INSULATOR	1 3	BOX IN-LINE CLIP	Al/Cu (2) 500kcmil-#4	2631 2633	2631R 2633R	F214434 K215450	H214942 P215960	5 6	500
	1 3	BOX IN-LINE CLIP	Cu** (2) 500kcmil-#4	2661 2663	2661R 2663R	Q216467 L217498	A216982 V218012	5 6	375

* Not UL Listed or CSA Certified

** Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks — Class H, K & R

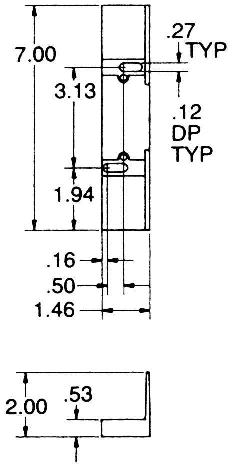


Figure 1

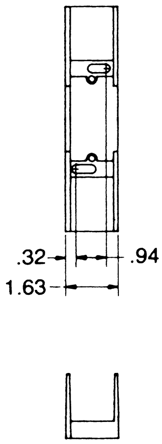


Figure 2

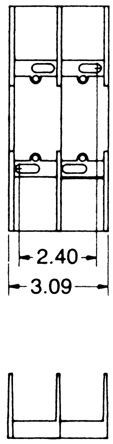


Figure 3

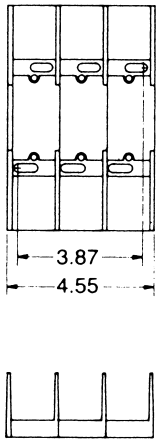


Figure 4

Recommended mounting screws for all 30A and 60A fuse blocks: 1/4" (.250" dia.)

600 Volt, 30 & 60 Ampere Class H, K and R Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER – TYPE OF CLIP: CLASS H & K NON-SPRING REINFORCED	CATALOG NUMBER – TYPE OF CLIP: CLASS H & K SPRING REINFORCED	CATALOG NUMBER – TYPE OF CLIP: CLASS R SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS H & K NON-SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS H & K SPRING REINFORCED	REFERENCE NUMBER – TYPE OF CLIP: CLASS R SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
30 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	60300 60301 60302 60303	60305 60306 60307 60308	60305R 60306R 60307R 60308R	C218525 Y219050 N219570 R222770	G223290 V211871 R212903 X213920	N211359 H212389 D213420 K214438	1 2 3 4	35
	ADDER 1 2 3	SCREW	Cu #10-14	60310 60311 60312 60313	60315 60316 60317 60318	60315R 60316R 60317R 60318R	M214946 P215454 T215964 V216471	Q217502 D218526 P219571 S222771	Z218016 Z219051 H222026 H223291	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE	Cu #10-14	60320 60321 60322 60323	60325 60326 60327 60328	60325R 60326R 60327R 60328R	Y201110 H201625 S204785 P211360	W211872 S212904 Y213921 N214947	J212390 E213421 L214439 Q215455	1 2 3 4	20
	ADDER 1 2 3	BOX	Cu* #4-14	- - - -	60355 60356 60357 60358	60355R 60356R 60357R 60358R	- - - -	V215965 E216986 A218017 A219052	W216472 R217503 E218527 Q219572	1 2 3 4	35
60 GFPC INSULATOR	ADDER 1 2 3	BOX	Al/Cu #2-14	60600 60601 60602 60603	60605 60606 60607 60608	60605R 60606R 60607R 60608R	J222027 T222772 Z201111 J201626	T204786 X211873 T212905 Z213922	Q211361 K212391 F213422 M214440	1 2 3 4	45
	ADDER 1 2 3	BOX	Cu* #4-14	- - - -	60655 60656 60657 60658	60655R 60656R 60657R 60658R	- - - -	A201112 R211362 L212392 A213923	V204787 Y211874 G213423 N214441	1 2 3 4	45

Note: To convert 30A or 60A adder pole to single pole, use end barrier #U09361.

* Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

North American Power Fuses

Cylindrical & Blade Fuse Blocks — Class H, K & R

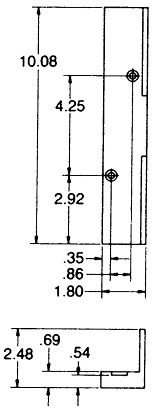


Figure 1

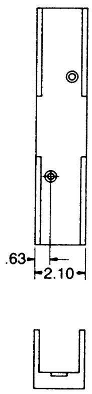


Figure 2

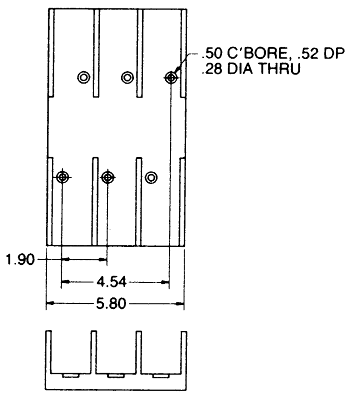


Figure 3

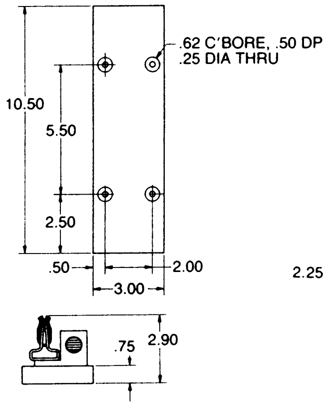


Figure 4

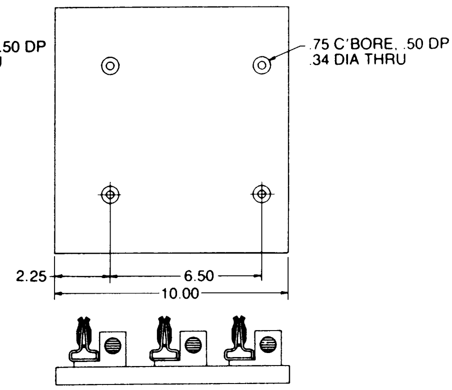


Figure 5

Recommended mounting screws:
All 100A-1/4" (.250" dia.)
200A, 1-pole - #10 (.190" dia.)
200A, 3-pole - 5/16" (.313" dia.)

600 Volt, 100 & 200 Ampere Class H, K and R Fuse Blocks

AMPERE RATING	POLES	CONNECTOR		CATALOG NUMBER		REFERENCE NUMBER		FIG.	CONNECTOR TORQUE In - lb
				TYPE OF CLIP		TYPE OF CLIP			
		TYPE	WIRE RANGE	CLASS H & K SPRING REINFORCED	CLASS R SPRING REINFORCED	CLASS H & K SPRING REINFORCED	CLASS R SPRING REINFORCED		
100 PHENOLIC INSULATOR	ADDER 1 3	BOX	Al/Cu 2/0-#6	61035 61036 61038	61035R 61036R 61038R	K223293 K201627 S211363	B201113 W204788 Z211875	1 2 3	120
	ADDER 1 3	BOX	Cu* 2/0-#12	61005 61006 61008	61005R 61006R 61008R	Q214949 X215967 G216988	S215457 X216473 T217505	1 2 3	50
200 PHENOLIC INSULATOR	1 3	BOX SIDE-CLIP	AL/Cu 350kcmil-#6	62001 62003	62001R 62003R	M212393 H213424	V212906 B213924	4 5	375
	1 3	BOX SIDE-CLIP	Cu* 350kcmil-#6	62051 62053	62051R 62053R	Y216474 V217506	H216989 D218020	4 5	275

Note: Adder poles can only be added to other fuse blocks. There is no end barrier to convert them to single pole fuse blocks.
* Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks Class H, K & R

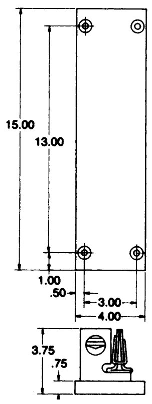


Figure 1

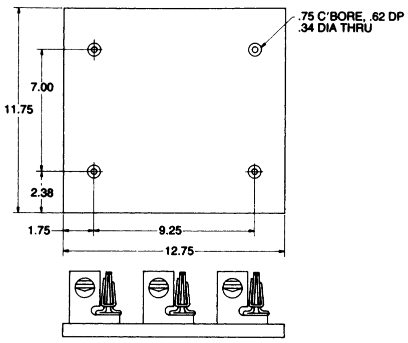


Figure 2

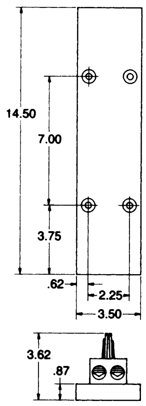


Figure 3

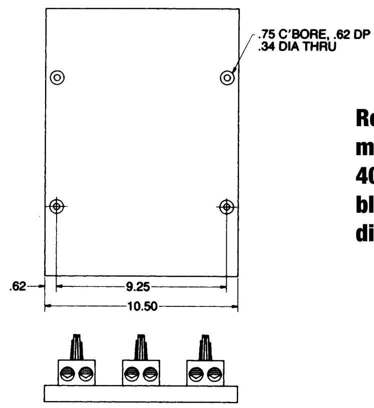


Figure 4

Recommended mounting screws for all 400A and 600A fuse blocks: 5/16 (.313" dia.)

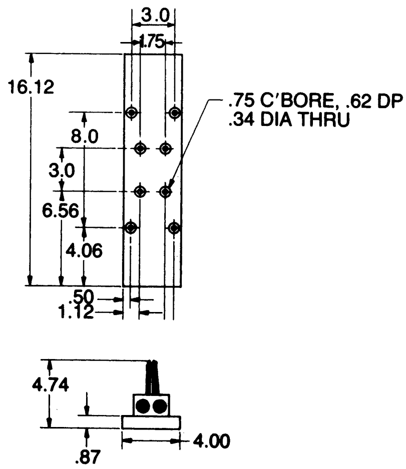


Figure 5

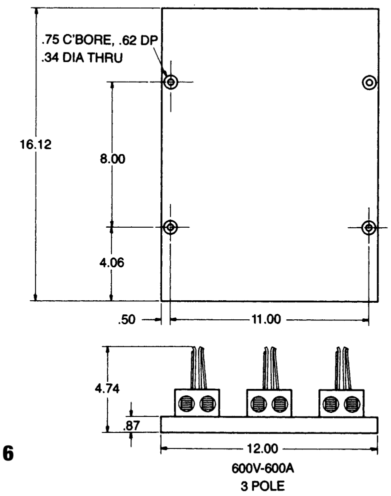


Figure 6

600 Volt, 400 & 600 Ampere Class H, K and R Fuse Blocks

AMPERE RATING	POLES	CONNECTOR		CATALOG NUMBER – TYPE OF CLIP		REFERENCE NUMBER – TYPE OF CLIP		FIG.	CONNECTOR TORQUE In - lb
		TYPE	WIRE RANGE	CLASS H & K SPRING REINFORCED	CLASS R SPRING REINFORCED	CLASS H & K SPRING REINFORCED	CLASS R SPRING REINFORCED		
400 PHENOLIC INSULATOR	1 3	BOX* SIDE-CLIP	Al/Cu 1000-250kcmil	64001 64003	64001R 64003R	H218530 T219575	D219055 M222030	1 2	375
	1 3	BOX* SIDE-CLIP	Cu** 1000-250kcmil	64051 64053	64051R 64053R	A211876 W212907	N212394 J213425	1 2	375
	1 3	BOX IN-LINE CLIP	AL/Cu (2) 350kcmil-#4	64031 64033	64031R 64033R	C201114 H204845	L201628 T211364	3 4	275
	1 3	BOX IN-LINE CLIP	Cu** (2) 350kcmil-#6	64061 64063	64061R 64063R	C213925 S214951	Q214443 V215459	3 4	275
600 PHENOLIC INSULATOR	1 3	BOX IN-LINE CLIP	Al/Cu (2) 500kcmil-#4	6631 6633	6631R 6633R	Z216475 W217507	J216990 E218021	5 6	500
	1 3	BOX IN-LINE CLIP	Cu** (2) 500kcmil-#4	6661 6663	6661R 6663R	J218531 V219576	E219056 N222031	5 6	375

* Not UL Listed or CSA Certified

** Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks — Class T



CLASS T FUSE BLOCKS

Ferraz Shawmut Class T Fuse Blocks accommodate Class T fuses up to 600A. Insulators are either of durable, glass-filled polycarbonate (GFPC) or phenolic with verified dielectric strength in excess of 2500V. Ferraz Shawmut is the only manufacturer to offer Class T blocks with copper connectors.

FEATURES/BENEFITS

- ✔ **Unique integral DIN rail adapters** for 600V, 30 & 60A blocks
- ✔ **Full barrier design** (30 & 60A) increases pole to pole safety
- ✔ **Unique adder-block design** (30 & 60A) for design flexibility
- ✔ **Spring reinforcing** standard for all 30 & 60A clips
- ✔ **Features high conductivity** copper alloy fuse clips
- ✔ **Cool running high amperage** (100 - 600A) connectors
- ✔ **Copper connectors** available 30 - 600A

Ratings

- ✔ 300VAC:
  30A, 60A, 100A, 200A, 400A, 600A
- ✔ 600VAC:
  30A, 60A, 100A, 200A, 400A, 600A
- ✔ Withstand Rating:
  200,000A Symmetrical

Approvals

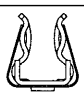
- ✔ All fuse blocks meet the requirements of UL Std. 512
- ✔ UL Listed, Guide IZLT, File E52283
- ✔ UL Recognized Component Guide IZLT2, File E52283
- ✔ CSA Certified Class 6225, File 32169

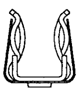
RECOMMENDED FUSE USAGE

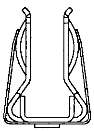
Class T Blocks (300V) . . . . . . .use with **A3T**
Class T Blocks (600V) . . . . . . .use with **A6T**

CLIP & CONNECTOR TYPES

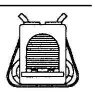
SPRING REINFORCED 30A & 60A CLIPS

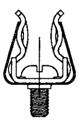
300V - 30A
600V - 30A 

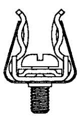
300V - 60A 

600V - 60A 

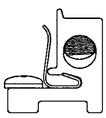
CONNECTORS FOR SPRING REINFORCED 30A & 60A CLIPS

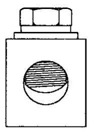
30A - 60A BOX 

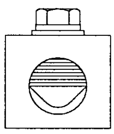
30A - 60A SCREW 

30A - 60A PRESSURE PLATE 

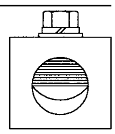
CONNECTORS

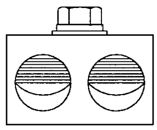
100A BOX SIDE CLIP 

100A BOX 

200A BOX 

CONNECTORS

400A BOX 

600A BOX 

Cylindrical & Blade Fuse Blocks — Class T

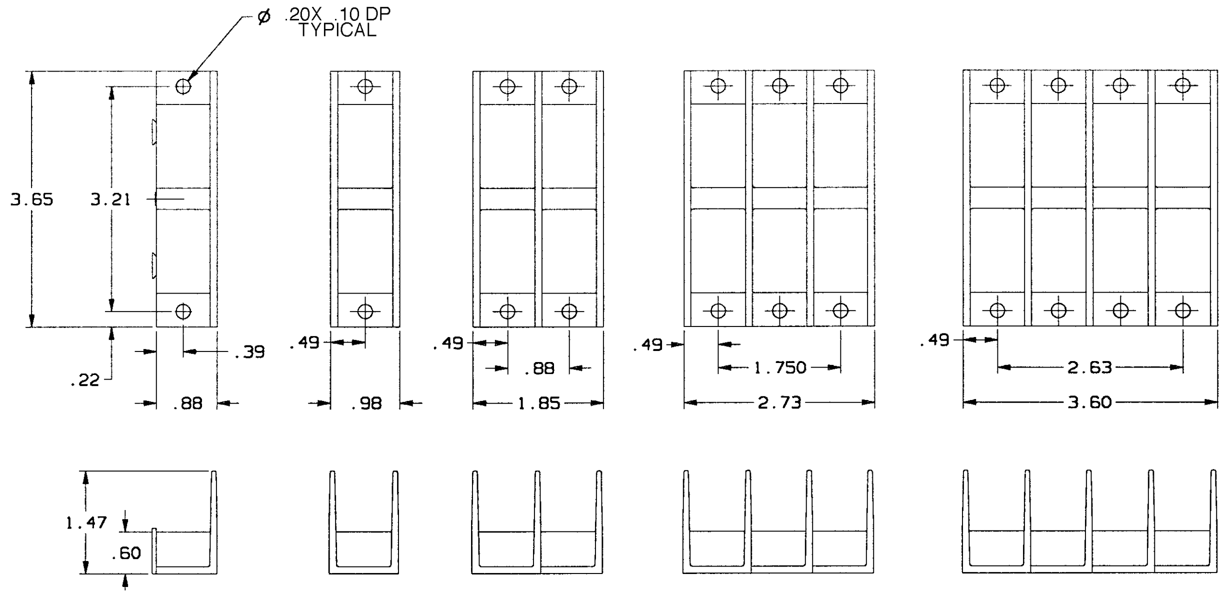


FIGURE 1 FIGURE 2 FIGURE 3 FIGURE 4 FIGURE 5

300 Volt, 30 & 60 Ampere Class T Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER SPRING REINFORCED	REF. NUMBER SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
30 GFPC INSULATOR	ADDER	BOX	Al/Cu #2-14	30305T	J214943		1
	1			30306T	L215451	2	
	2			30307T	Q215961	3	35
	3			30308T	R216468	4	
	4			30309T	B216983	5	
	ADDER	SCREW	Cu #10-14	30315T	M217499	1	20
	1			30316T	W218013	2	
	2			30317T	A218523	3	
	3			30318T	W219048	4	
	4			30319T	L219568	5	
	ADDER	PRESSURE PLATE	Cu #10-14	30325T	F222024	1	20
	1			30326T	Q222769	2	
	2			30327T	E223288	3	
	3			30328T	W201108	4	
	4			30329T	F201623	5	
	ADDER	BOX	Cu* #4-14	30355T	H204776	1	35
	1			30356T	L211357	2	
	2			30357T	S211869	3	
	3			30358T	F212387	4	
	4			30359T	Q212902	5	
60 GFPC INSULATOR	ADDER	SCREW	Cu #10-14	30615T**	R215962**	1	20
	1			30616T**	S216469**	2	
	2			30617T**	C216984**	3	
	3			30618T**	N217500**	4	
	4			30619T**	X218014**	5	
	ADDER	BOX	Al/Cu #2-14	30605T	B213418	1	45
	1			30606T	V213918	2	
	2			30607T	H214436	3	
	3			30608T	K214944	4	
	4			30609T	M215452	5	
	ADDER	BOX	Cu* #4-14	30655T	B218524	1	45
	1			30656T	X219049	2	
	2			30657T	M219569	3	
	3			30658T	G222025	4	
	4			30659T	F223289	5	

Recommended base mounting screws: #10 (.190" dia.)

Note: * Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

** UL Component Recognized

Cylindrical & Blade Fuse Blocks — Class T

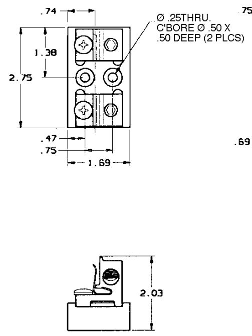


FIGURE 1

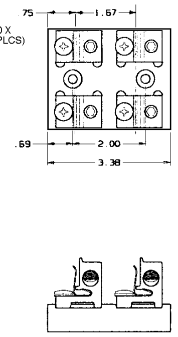


FIGURE 2

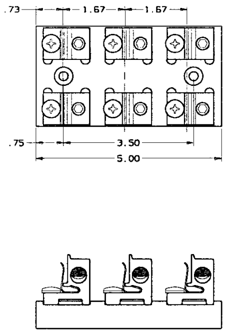


FIGURE 3

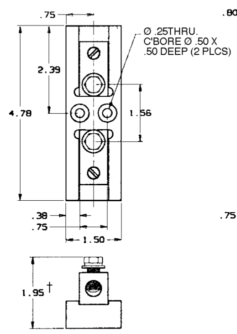


FIGURE 4

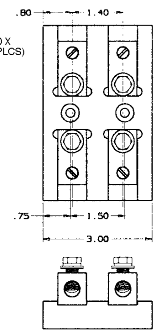


FIGURE 5

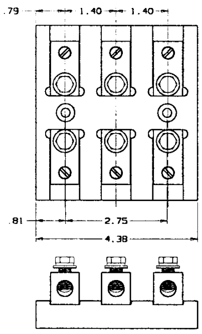


FIGURE 6

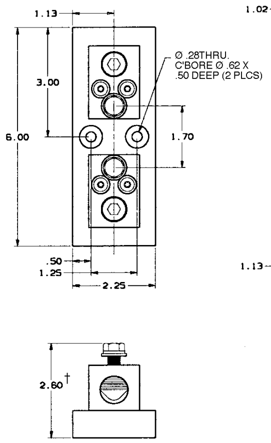


FIGURE 7

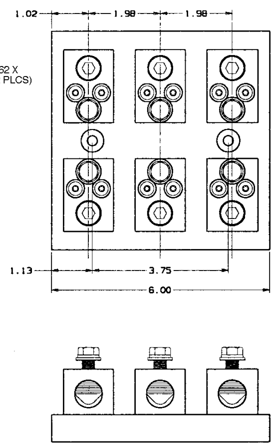


FIGURE 8

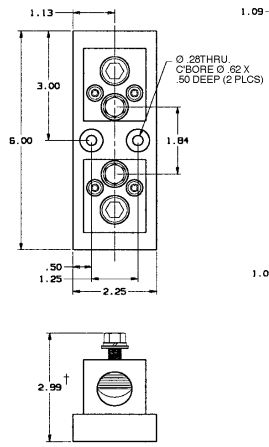


FIGURE 9

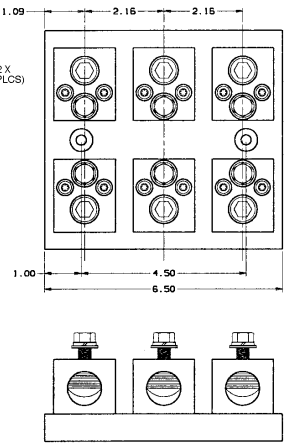


FIGURE 10

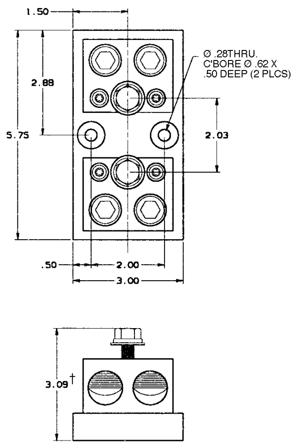


FIGURE 11

300 Volt, 100, 200, 400 & 600 Ampere Class T Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NO. SPRING REINFORCED	REF NUMBER SPRING REINFORCED	FIG.	TORQUE (IN-LBS) CONNECTOR	TORQUE (IN-LBS) FUSE BOLT
100 PHENOLIC INSULATOR	1		Al/Cu	31031T	M211358	1		
	2	BOX	2/0-#6	31032T	T211870	2	120	–
	3	SIDE-CLIP		31033T	G212388	3		
	1		Cu*	31001T	X201109	4		
	2	BOX	2/0-#12	31002T	G201624	5	50	72
	3			31003T	R204784	6		
200 PHENOLIC INSULATOR	1	BOX	Al/Cu	32031T	C213419	7	275	132
	3		350 kcmil-#6	32033T	W213919	8		
	1	BOX	Cu*	32051T	J214437	7	275	132
	3		350 kcmil-#6	32053T	L214945	8		
400 PHENOLIC INSULATOR	1	BOX	Al/Cu	34031T	N215453	9	600	228
	3		600 kcmil-#2	34033T	S215963	10		
	1	BOX	Cu*	34051T	T216470	9	375	228
	3		600 kcmil-#2	34053T	D216985	10		
600 PHENOLIC INSULATOR	1	BOX	Al/Cu (2) 600 kcmil-#2	36031T	P217501	11	600	360
	1	BOX	Cu* (2) 600 kcmil-#2	36051T	Y218015	11	375	360

† Note: Height includes nominal fuse blade thickness

Recommended base mounting screws:
100A & 200A, #10 (.190" dia.)
400A & 600A, Z\v" (.250" dia.)

Note: * Fuse blocks have copper box connectors and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

Cylindrical & Blade Fuse Blocks — Class T

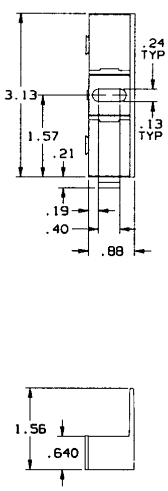


FIGURE 1

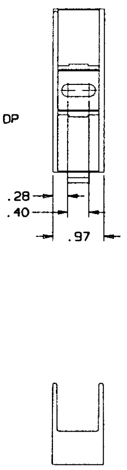


FIGURE 2

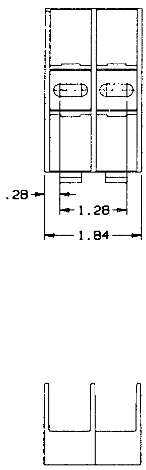


FIGURE 3

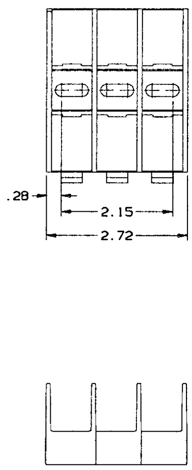


FIGURE 4

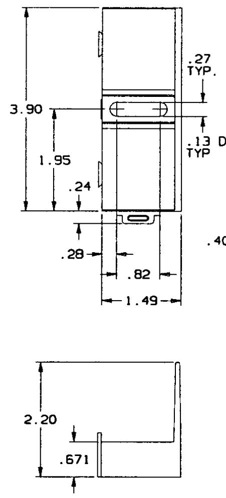


FIGURE 5

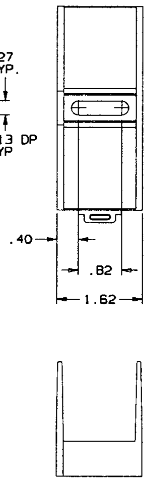


FIGURE 6

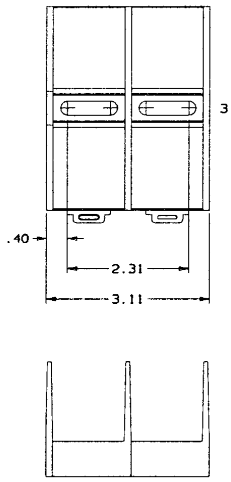


FIGURE 7

600 Volt, 30 & 60 Ampere Class T Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER SPRING REINFORCED	REFE. NUMBER SPRING REINFORCED	FIG.	CONNECTOR TORQUE In - lb
30 GFPC INSULATOR	ADDER	BOX	Al/Cu #2-14	60305T	B211877	1	35
	1			60306T	P212395	2	
	2			60307T	X212908	3	
	3			60308T	K213426	4	
	ADDER	SCREW	Cu #10-14	60315T	D213926	1	20
	1			60316T	R214444	2	
	2			60317T	T214952	3	
	3			60318T	W215460	4	
	ADDER	PRESSURE PLATE	Cu #10-14	60325T	Z215969	1	20
	1			60326T	A216476	2	
	2			60327T	K216991	3	
	3			60328T	X217508	4	
	ADDER	BOX	Cu* #4-14	60355T	F218022	1	35
	1			60356T	K218532	2	
	2			60357T	F219057	3	
	3			60358T	W219577	4	
60 GFPC INSULATOR	ADDER	SCREW	Cu #10-14	60615T**	N201630**	5	20
	1			60616T**	N204850**	6	
	2			60617T**	W211366**	7	
	3			60618T**	C211878**	8	
	ADDER	BOX	Al/Cu #2-14	60605T	P222032	5	45
	1			60606T	Z222777	6	
	2			60607T	N223296	7	
	3			60608T	E201116	8	
	ADDER	BOX	Cu* #4-14	60655T	Q212396	5	45
	1			60656T	Y212909	6	
	2			60657T	L213427	7	
	3			60658T	E213927	8	

Note: * Fuse blocks have copper box connectors and clips and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

** UL Component Recognized

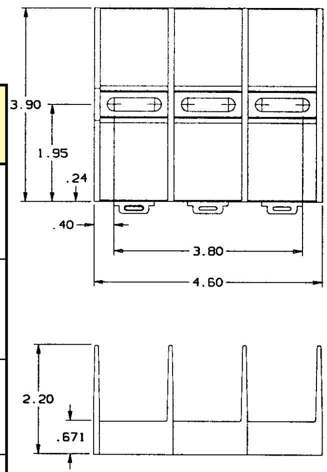


FIGURE 8

Recommended mounting screws:
30A, #10 (.190" dia.)
60A, Z\v" (.250" dia.)

Cylindrical & Blade Fuse Blocks — Class T

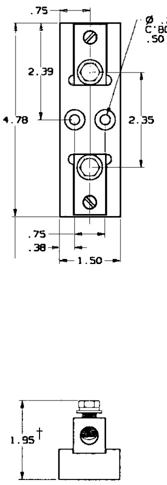


FIGURE 1

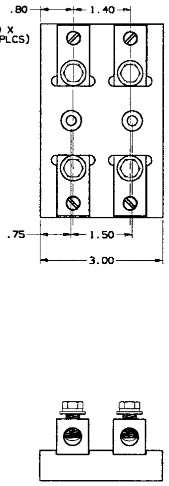


FIGURE 2

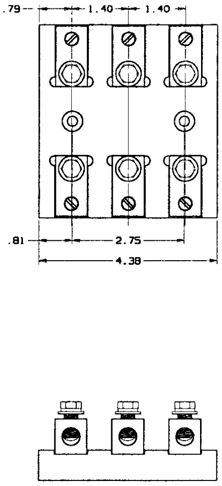


FIGURE 3

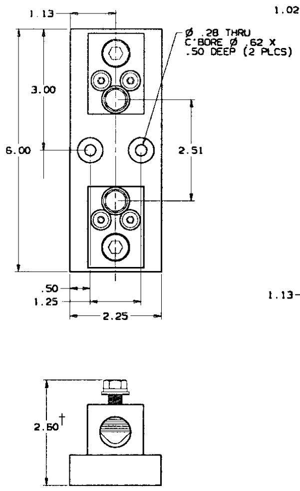


FIGURE 4

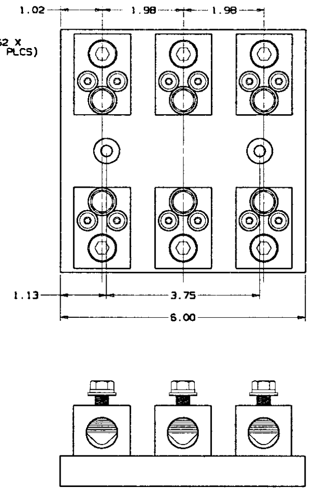


FIGURE 5

Recommended base mounting screws:
100A & 200A, #10 (.190" dia.)
400A & 600A, Z\v" (.250" dia.)

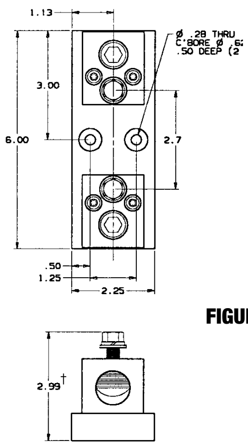


FIGURE 6

600 Volt, 100, 200, 400 & 600 Ampere Class T Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NO. SPRING REINFORCED	REF. NUMBER SPRING REINFORCED	FIG	TORQUE (IN-LBS) CONNECTOR	TORQUE (IN-LBS) FUSE BOLT
100 PHENOLIC INSULATOR	1 2 3	BOX	Al/Cu 2/0-#6	61031T 61032T 61033T	S214445 V214953 X215461	1 2 3	120	72
	1 2 3	BOX	Cu* 2/0-#12	61051T 61052T 61053T	A215970 B216477 L216992	1 2 3	50	72
200 PHENOLIC INSULATOR	1 3	BOX	Al/Cu 350 kcmil-#6	62031T 62033T	Y217509 L218533	4 5	275	132
	1 3	BOX	Cu* 350 kcmil-#6	62051T 62053T	G219058 X219578	4 5	275	132
400 PHENOLIC INSULATOR	1	BOX	Al/Cu 600 kcmil-#2	64031T	Q222033	6	600	228
	1	BOX	Cu* 600 kcmil-#2	64051T	A222778	6	375	228
600 PHENOLIC INSULATOR	1	BOX	Al/Cu (2) 600 kcmil-#2	66031T	P223297	7	600	360
	1	BOX	Cu* (2) 600 kcmil-#2	66051T	F201117	7	375	360

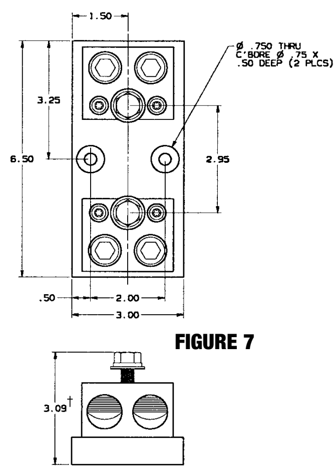


FIGURE 7

Note: * Fuse blocks have copper box connectors and are for copper wires only. These are specifically designed with the same coefficient of expansion as copper wire for improved heat cycling and meet or exceed OEM "no aluminum" specifications.

† Note: Height includes nominal fuse blade thickness

Cylindrical & Blade Fuse Blocks — Class G



CLASS G FUSE BLOCKS

Ferraz Shawmut Class G Fuse Blocks accommodate all 15, 20, 30 and 60 Ampere Class G fuses. A choice of box, screw or pressure-plate connectors fit a wide range of stranded or solid copper wire. Insulators are glass-filled polycarbonate (GFPC) with verified dielectric strength in excess of 2500V. Fuse blocks feature a unique adder block which can be snapped onto 1-, 2-, or 3-pole blocks to form multi-pole segmented blocks of as many poles as desired. All fuse clips are made of high conductivity tin-plated copper alloy.

Features/Benefits

- ✔ **Unique integral DIN rail adapters** for 15, 20 & 30A blocks
- ✔ **Unique adder-block design** (all ampere ratings) for design flexibility
- ✔ **Spring reinforcing** standard for 60A clips
- ✔ **Features high conductivity** copper alloy fuse clips

Ratings

- ✔ 600VAC: 15A & 20A
- ✔ 480VAC: 30A & 60A
- ✔ Withstand Rating:
  100kA using screw, pressure plate or box connections,
  10kA using quick connects.
- ✔ Temperature/flammability:
  GFPC insulators rated 125°C RTI, 94V-0 flammability

Approvals

- ✔ All fuse blocks meet the requirements of UL Std. 512
- ✔ UL Listed
  Guide IZLT, File E52283
- ✔ CSA Certified
  Class 6225, File 32169

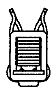
RECOMMENDED FUSE USAGE

Class G Blocks . . . . .use with **AG**

Clip & Connector Types

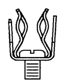
15, 20, 30, 60A G

COPPER BOX CONNECTOR OR ALUMINUM BOX CONNECTOR



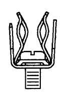
15, 20, 30A G

SCREW WITH DOUBLE QUICK-CONNECTS



15, 20, 30A G

PRESSURE PLATE WITH DOUBLE-QUICK CONNECTS



Cylindrical & Blade Fuse Blocks — Class G

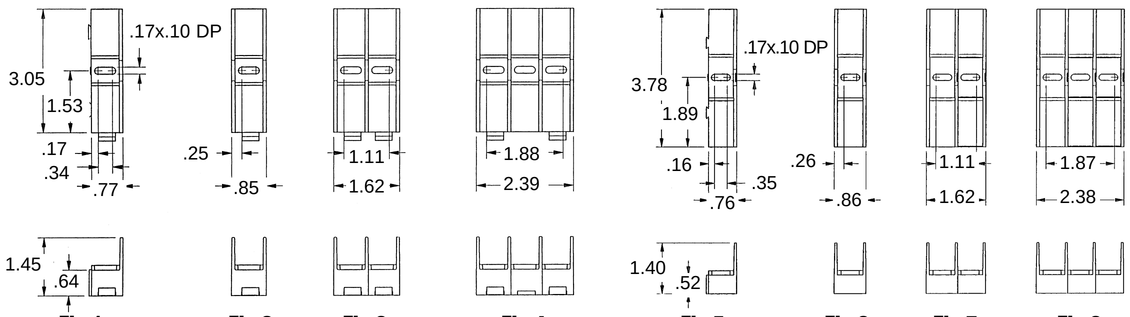


Fig 1 Fig 2 Fig 3 Fig 4 Fig 5 Fig 6 Fig 7 Fig 8

600 Volt, 15 & 20 Ampere; 480 Volt 30 & 60 Ampere Class G Fuse Blocks

AMPERE RATING	POLES	CONNECTOR TYPE	CONNECTOR WIRE RANGE	CATALOG NUMBER	REFERENCE NUMBER	FIG	CONNECTOR TORQUE IN-LB
15 GFPC INSULATOR	ADDER 1 2 3	SCREW W/DOUBLE QUICK CONNECTS AT BOTH ENDS	Cu #10-14	40110G 40111G 40112G 40113G	L219062 B219582 V222037 E222782	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE (SEMS) W/DOUBLE QUICK CONNECTS AT BOTH ENDS	Cu #10-14	40120G 40121G 40122G 40123G	R223299 K201121 T201635 Y204882	1 2 3 4	20
	ADDER 1 2 3	COPPER BOX	Cu #6-14	40150G 40151G 40152G 40153G	A211370 G211882 V212400 C212913	1 2 3 4	35
20 GFPC INSULATOR	ADDER 1 2 3	SCREW W/DOUBLE QUICK CONNECTS AT BOTH ENDS	Cu #10-14	40210G 40211G 40212G 40213G	Q213431 K213932 Y214450 A214958	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE (SEMS) W/DOUBLE QUICK CONNECTS AT BOTH ENDS	Cu #10-14	40220G 40221G 40222G 40223G	C215466 F215975 E216480 R216997	1 2 3 4	20
	ADDER 1 2 3	COPPER BOX	Cu #6-14	40250G 40251G 40252G 40253G	D217514 L218027 R218538 M219063	1 2 3 4	35
30 GFPC INSULATOR	ADDER 1 2 3	SCREW W/DOUBLE QUICK CONNECTS AT BOTH ENDS	Cu #10-14	40310G 40311G 40312G 40313G	C219583 W222038 F222783 S223300	1 2 3 4	20
	ADDER 1 2 3	PRESSURE PLATE (SEMS) W/DOUBLE QUICK CONNECTS AT BOTH ENDS	Cu #10-14	40320G 40321G 40322G 40323G	V201636 A204884 B211371 H211883	1 2 3 4	20
	ADDER 1 2 3	COPPER BOX	Cu #6-14	40350G 40351G 40352G 40353G	W212401 D212914 R213432 L213933	1 2 3 4	35
60 GFPC INSULATOR	ADDER 1 2 3	ALUMINUM BOX	Al/Cu #2-14	40605G 40606G 40607G 40608G	Z214451 D215467 G215976 F216481	5 6 7 8	45
	ADDER 1 2 3	COPPER BOX	Cu #4-14	40655G 40656G 40657G 40658G	- S216998 M218028 S218539	5 6 7 8	45

Cylindrical & Blade Fuse Blocks DFC



DFC DEAD-FRONT FUSE COVERS

Ferraz Shawmut DFC Dead-Front Fuse Covers snap on to individual fuses installed in fuse blocks, covering exposed live clips and terminals and reducing accidental contact by personnel. They are sized to fit Class G, H, J, K, R, CC or Midget fuses for increased safety and (optional) open-fuse indication. All DFC Dead-Front Fuse Covers are reusable when a fuse is replaced – simply detach from the open fuse and re-attach to the new replacement fuse. On indicator models an orange indicator light will illuminate to indicate an open fuse. DFC Fuse Cover ends can be easily cut to accommodate existing wiring, safety switches or special installations. A blank label is provided with each DFC to write in circuit or fuse information.

Ratings

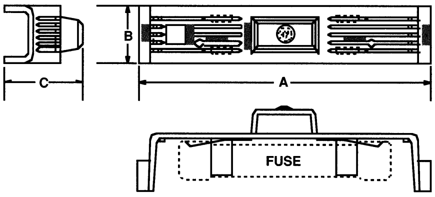
- ✔ Fit fuses rated 0 to 100A
- ✔ **Indicating:** 90 to 600VAC 115 to 600VDC
- ✔ **Non-Indicating:** 0 to 600V AC/DC

Approvals

- ✔ UL Listed (All except Midget size) Guide JDVS, File E90426
- ✔ UL Recognized Component (Midget) Guide JDVS2, File E90426
- ✔ CSA Certified Class 6228, File 70159

Features/Benefits

- ✔ **Innovative design** provides dead-front electrical safety to personnel
- ✔ **Optional orange indicator light** shows open fuse
- ✔ **Many sizes** to fit virtually all popular fuses/fuse blocks
- ✔ **Reusable** with no changes or additional cost
- ✔ **Labels provided** for write-in identification
- ✔ **Thermoplastic** flammability rating of UL 94-V2
- ✔ **Low leakage current** <0.6 mA at 600V



Reference Numbers – Descriptions – Dimensions

CATALOG NUMBER		REFERENCE NUMBER		FUSES ACCOMMODATED			DIMENSIONS		
INDICATING	NON-INDICATING	INDICATING	NON-INDICATING	AMPS	VOLTS	CLASS	A	B	C
DFC1I	DFC-1	-	J222050	0-30 and 35-60	600 250	J R, K, H	5.02	1.03	1.94
DFC-2I	DFC-2	X201132	G223313	0-30	600	R, K, H	7.03	1.30	2.07
DFC-3I	DFC-3	X205065	G201647	65-100	600	J	7.03	1.30	2.33
DFC-4I	DFC-4	X211896	Q211384	65-100	250	R, K, H	8.20	1.30	2.18
DFC-5I	DFC-5	R212926	J212413	35-60	600	R, K, H	8.20	1.30	2.18
DFC-6I	DFC-6	A213946	E213444	35-60	600	J	4.98	1.17	2.14
DFC-7I	DFC-7	P214971	N214464	0-30	600	Midget, CC	3.82	0.75	1.72
DFC-8I	DFC-8	W215989	S215480	65-100	600	R, K, H	10.38	1.50	2.33
DFC-9I	DFC-9	G217011	S216492	0-30	250	R, K, H	3.82	0.75	1.72

WARNING: To avoid electrical shock, **TURN POWER OFF** before installing, removing or servicing.

Cylindrical & Blade Fuse Blocks DFC

Ferraz Shawmut Fuses and Fuse Blocks for use with DFC

FUSE	FUSE BLOCK	DFC	FUSE	FUSE BLOCK	DFC
AJT0-30	603xxJ	-1I, -1	A6Y0-30-2B	303xx	-7I, -7
AJT35-60	606xxJ	-6I, -6	A60Q0-30-2	303xx	-7I, -7
AJT65-100	610xxJ	-3I, -3	A60X0-30-1	603xx	-1I, -1
ATDR	303xxR	-7I, -7	A70P10-30-1	203xx	-9I, -9
ATM	303xx	-7I, -7	GFN0-30	303xx	-7I, -7
ATMR	303xxR	-7I, -7	GGU0-30	303xx	-7I, -7
ATQ	303xx	-7I, -7	OT0-30	203xx	-9I, -9
ATQR	30xxR	-7I, -7	OT35-60	206xx	-1I, -1
A13X1-30-2	303xx	-7I, -7	OT65-100	210xx	-4I, -4
A2D0-30R	203xxR	-9I, -9	OTM0-30	303xx	-7I, -7
A2D35-60R	206xxR	-1I, -1	OTS0-30	603xx	-2I, -2
A2D65-100R	210xxR	-4I, -4	OTS35-60	606xx	-5I, -5
A2K0-30R	203xxR	-9I, -9	OTS65-100	610xx	-8I, -8
A2K35-60R	206xxR	-1I, -1	RF0-30	203xx	-9I, -9
A2K65-100R	210xxR	-4I, -4	RF35-60	206xx	-1I, -1
A2Y0-30	203xx	-9I, -9	RF65-100	210xx	-4I, -4
A2Y35-60	206xx	-1I, -1	RFS0-30	603xx	-2I, -2
A2Y65-100	210xx	-4I, -4	RFS35-60	606xx	-5I, -5
A25X1-30-1	203xx	-9I, -9	RFS65-100	610xx	-8I, -8
25Z1-30-2	303xx	-7I, -7	TR0-30R	203xx	-9I, -9
A4J1-30	603xxJ	-1I, -1	TR35-60R	206xx	-1I, -1
A4J35-60	606xxJ	-6I, -6	TR65-100R	210xx	-4I, -4
A4J65-100	610xxJ	-3I, -3	TRM0-30	303xx	-7I, -7
A50P10-30	203xx	-9I, -9	TRS0-30R	603xxR	-2I, -2
A6D0-30R	603xxR	-2I, -2	TRS35-60R	606xxR	-5I, -5
A6D35-60R	606xxR	-5I, -5	TRS65-100R	610xxR	-8I, -8
A6D65-100R	610xxR	-8I, -8	TRS35-60RDC	606xxR	-5I, -5
A6K0-30R	603xxR	-2I, -2	TRS65-100RDC	610xxR	-8I, -8
A6K35-60R	606xxR	-5I, -5			
A6K65-100R	610xxR	-8I, -8			

Note: DFC Covers fit single pole blocks and each pole of multi-pole blocks.

Ask sales representative for data sheets on DFC trim instructions for safety switches.

WARNING: To avoid electrical shock, **TURN POWER OFF** before installing, removing or servicing.

UltraSafe Holders — USCC & USM



ULTRASAFE™ MODULAR FUSE HOLDERS

Ferraz Shawmut ULTRASAFE™ modular 600 volt Fuse Holders introduce a new level of safety for Class CC (USCC) and Midget 1-1/2" x 13/32" (USM) fuses up to 30 amperes. ULTRASAFE holders qualify as "finger safe" under IEC and DIN standards to an IP2 grade of protection, including fuse changing (with the flick of a finger). ULTRASAFE holders are available in 1, 2, 3 or 4 pole, with or without blown-fuse indicators in each pole. The multi-pole units can also be made up by ordering pin-tie handles for field assembly. ULTRASAFE holders save up to 15% mounting space and any combination can be snapped onto 35mm DIN rail for extra savings in panel building time. ULTRASAFE holders with Class CC fuses chosen for Type 2 protection give one of the safest protection packages in the industry. ULTRASAFE body material is tough and durable polyamide, with exceptional insulating properties.

HIGHLIGHTS:

- ✔ Finger Safe
- ✔ Optional Indicator Lights
- ✔ DIN Rail Mount
- ✔ Compact Footprint
- ✔ Quick, Easy Fuse Change

APPLICATIONS:

- ✔ All circuits up to 600 volts for motors, control circuits, transformers, etc.
- ✔ Non-load disconnect

Ratings

- ✔ 600VAC: 30A
- ✔ Withstand rating:
  Class CC 200kA I.R.
  Midget Fuse 100kA I.R.
- ✔ Min. voltage to operate indicator light:
  90VAC, 115VDC
  [Less than 0.7 mA leakage current at 600V]

Approvals

- ✔ All ULTRASAFE Fuse Holders meet the requirements of UL512
- ✔ UL Listed
  Class CC
  Guide IZLT, File E52283
- ✔ UL Recognized Component
  Midget Guide IZLT2,
  File E52283
- ✔ CSA Certified
  Class CC & Midget
  C22.2, Class 6225
  File 32169

RECOMMENDED FUSE USAGE

USCC . . . . .use with **ATDR, ATMR, ATQR**

USM . . . . .use with **ATQ, ATM, A6Y-2B, A25Z-2, TRM, OTM, A13X-2, GFN, GGU, A60Q-2**

Midget Fuses

UltraSafe Holders USCC & USM

For use with Class CC Fuses

CAT. NUMBER	REF. NUMBER	DESCRIPTION
USCC1	B213441	1 pole
USCC1I	X213943	1 pole with indicator
USCC2	P216489	2 pole
USCC2I	D217008	2 pole with indicators
USCC3	M217522	3 pole
USCC3I	Y218038	3 pole with indicators
USCC3IN	N219593	3 pole with indicators and a 4th neutral pole
USCC3N	G222048	3 pole with a 4th neutral pole
USCC4	Q222792	4 pole
USCC4I	E223311	4 pole with indicators

For use with Midget (1-1/2” x 13/32”) Fuses

CAT. NUMBER	REF. NUMBER	DESCRIPTION
USM1	Y213944	1 pole
USM1I	L214462	1 pole with indicator
USM2	N217523	2 pole
USM2I	Z218039	2 pole with indicators
USM3	C218548	3 pole
USM3I	Y219073	3 pole with indicators
USM3IN	P219594	3 pole with indicators and a 4th neutral pole
USM3N	H222049	3 pole with a 4th neutral pole
USM4	R222793	4 pole
USM4I	F223312	4 pole with indicators

Neutral Link Pole

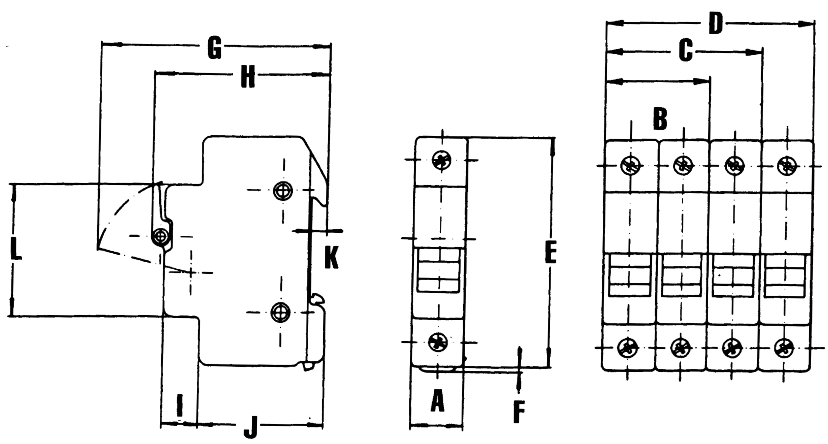
CAT. NUMBER	REF. NUMBER	DESCRIPTION
USN	W201131	1 Pole with Integral Neutral Link

Accessories

CAT. NUMBER	REF. NUMBER	DESCRIPTION
USPTH2	F201646	Pin-tie handle for 2 poles
USPTH3	C205047	Pin-tie handle for 3 poles
USPTH4	P211383	Pin-tie handle for 4 poles

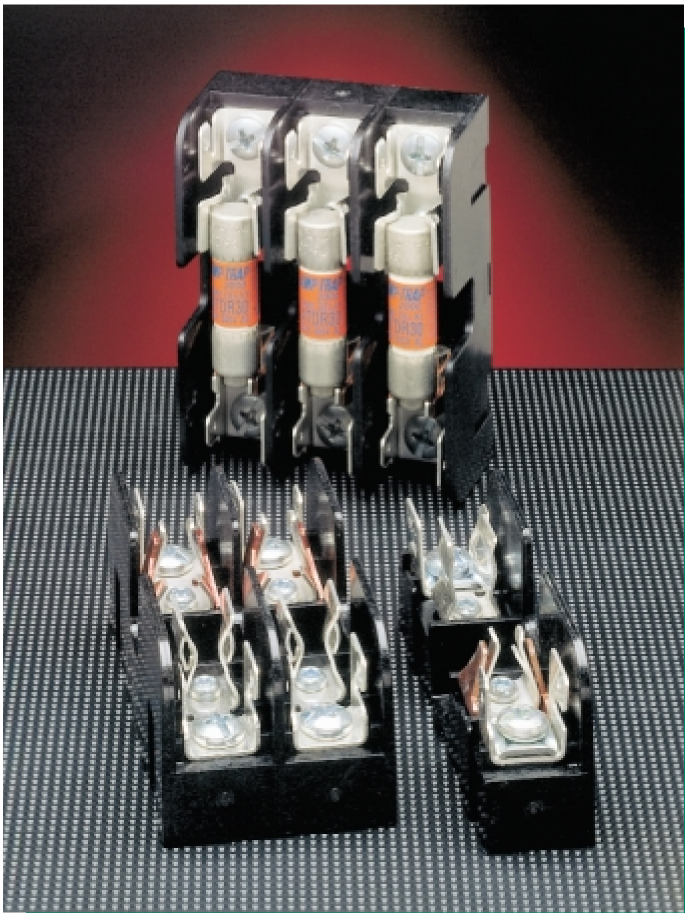
Dimensions

DIMENSION	mm	In
A	17.5	0.69
B	35.0	1.38
C	52.5	2.07
D	70.0	2.76
E	78.0	3.07
F	2.5	0.10
G	78.0	3.07
H	59.0	2.32
I	12.5	0.49
J	42.5	1.67
K	5.0	0.20
L	45.0	1.77



Terminal screws: Phillips/slot head
Suggested screw torque: 14.75 in-lbs. (2N.m)
Connector type: Pressure plate
Wire range: #6 to #14 (solid/stranded Cu)
Load-break disconnect: No

Midget & Class CC Fuse Blocks



600 VOLT MIDGET AND CLASS CC FUSE BLOCKS

Ferraz Shawmut Midget Fuse Blocks accommodate all 30 ampere 1-1/2” x 13/32” midget fuses. Class CC Fuse Blocks accommodate all 30 ampere Class CC fuses. A choice of box, screw, or pressure-plate connectors fit a wide range of stranded or solid copper wire. Insulators are glass-filled polycarbonate (GFPC) with verified dielectric strength in excess of 2500V. Fuse blocks feature a unique adder block which can be snapped onto 1-, 2- or 3-pole blocks to form multi-pole segmented blocks of as many poles as desired. All fuse clips are made of high conductivity tin-plated copper alloy.

Ratings

- ✔ 600VAC: 30A
- ✔ Withstand rating: 200kA using screw, pressure plate or box connections, 10kA using quick connects
- ✔ Temperature/ flammability: GFPC insulators rated 125ÞC, 94V-0 flammability

Approvals

- ✔ All fuse blocks meet the requirements of UL Std. 512

Midget Block

- ✔ UL Recognized Component Guide IZLT2, File E52283
- ✔ CSA Certified Class 6225, File 32169

Class CC Block

- ✔ UL Listed, Guide IZLT, File E52283
- ✔ CSA Certified Class 6225, File 32169

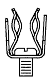
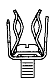
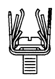
RECOMMENDED FUSE USAGE

Midget Fuse Block . . . . .use with **ATQ, ATM, A6Y-2B, A25Z-2, TRM, OTM, A13X-2, GFN, GGU, A60Q-2**

Class CC Fuse Block . . .use with **ATDR, ATMR, ATQR**

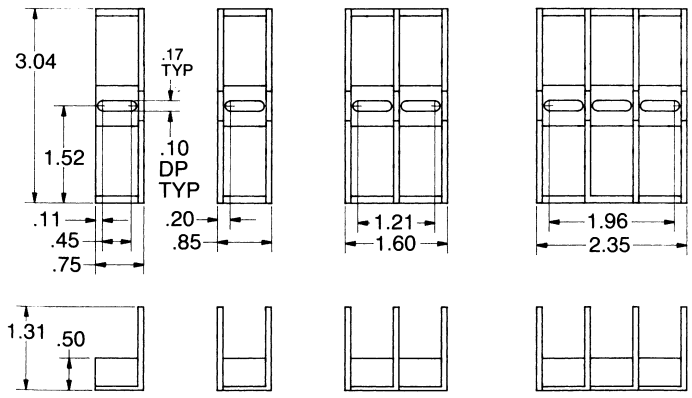
Clip & Connector Types

30A MIDGET/CC

COPPER BOX CONNECTOR	SCREW WITH DOUBLE QUICK-CONNECTS	PRESSURE PLATE WITH DOUBLE QUICK-CONNECTS	PRESSURE PLATE WITH DOUBLE QUICK-CONNECTS (CLASS CC REJECTION END)
			

Midget Fuses

Midget & Class CC Fuse Blocks



Adder 1 Pole 2 Pole 3 Pole

Recommended mounting screws for all Midget and Class CC fuse blocks: #8 (.164" dia.)

600 Volt, 30A Midget and Class CC Fuse Blocks

CONNECTOR			TYPE OF FUSE			CONNECTOR			
			CAT. NUM.	REF. NUM.		CAT. NUM.	REF.NUM.		TORQUE
TYPE	WIRE RANGE	POLES*	MIDGET	MIDGET	LISTING	CLASS CC	CLASS CC	LISTING	In - lb
Screw w/double quick connects at both ends	Cu #10-14	ADDER 1 2 3 4	30310 30311 30312 30313 30314	N211888 A212405 E214456 F214963 J215472	UR & CSA	30310R 30311R 30312R 30313R 30314R	W204857 R212397 Z212910 M213428 F213928	UL & CSA	20
Pressure plate (sems) w/double quick connects at both ends	Cu #10-14	ADDER 1 2 3 4	30320 30321 30322 30323 30324	S218033 Y218544 K222787 B201642 H211377	UR & CSA	30320R 30321R 30322R 30323R 30324R	Z217510 M218534 Y219579 B222779 Q201632	UL & CSA	20
Copper box	Cu #6-14	ADDER 1 2 3 4	30350 30351 30352 30353 30354	F214457 G214964 L216486 Z217004 J217519	UR & CSA	30350R 30351R 30352R 30353R 30354R	N213429 G213929 V214447 X214955 Z215463	UL & CSA	35

Note: To convert Midget or Class CC adder pole to single pole, use end barrier #U09301.

* Available in any number of poles. Replace last digit in Catalog Number with number of poles needed.
Example: 303112 is a 12-pole screw/double QC connector Midget Fuse Block.
Total width of N poles = (N x .76) + .08 inches. 12 poles = (12 x .76") + .08" = 9.20".

Note: Refer to page 633 for information regarding fuse block accessories: DFC 3M, DFC 3LP, DRM.

French Ferrule Fuses

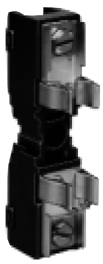
Bases

SI

FUSE HOLDERS
FOR FERRULE-TYPE FUSES
ø 14 - 22

- SHOCK-PROOF MODULAR ASSEMBLY
  COMPLIANT WITH IEC 269.2.1 AND NF C 63130
- BASE MOUNTING WITH OR WITHOUT MICROSWITCH
  AND ISOLATING PARTITION
- PHENOLIC RESIN FOR BASIC APPLICATIONS
  (BASIC MODEL)
- SELF-EXTINGUISHABLE FIBERGLASS POLYESTER
  FOR TRACTION AND CORROSIVE ATMOSPHERE
  APPLICATIONS (SALT SPRAY-PROOF MODEL)

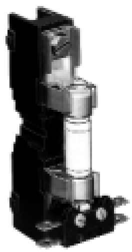
SI 14



SI 22



SI with microswitch



MAIN CHARACTERISTICS

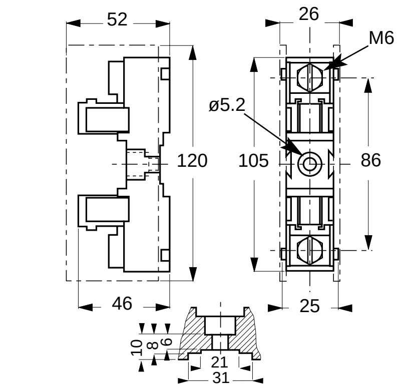
Model		Thermal current rating (Ith)	Maximum power losses	Rated insulation voltage Ui AC or DC according VDE 0110:565 - group C withstand	Dielectric withstand tests R.M.S. voltage 1mn 50-60 Hz	Dielectric withstand tests Voltage shock 1.2/50µs Uimp. : impulse voltage as per IEC 947-1	Fire and fumes class NF F 16-101 and 102 and UL
Phenolic resin (standard)	SI 14	63 A	16 W per phase	750 V	8 kV between phase and mass	between phase and mass	UL 94-HB
	SI 22	135 A	26 W per phase		3 kV between phases and microswitch	between phases and microswitch	
Salt-spray proof fiber glass polyester	SKI 14	63 A	16 W per phase	750 V			I1-F1
	SKI 22	135 A	26 W per phase		Tests according to IEC 60 and 694 and NF C 64010 Dry atmosphere and new fusegear		UL 94-V0

Connecting with 16 mm max. width, 5mm max. thick terminal for SI 14 and 22 mm max. for SI 22
* Only for the base. Accessories (partitions and microswitches) are not classified due to their lightness.

Basic model
Max. temperature (°C)/Relative Humidity (%): 20 °C/95% - 40°C/80% - 50°C/50%
If Holder must be kept off, a heating system fed during stop periods must be used. Purpose is to keep the temperature of cubicle at a level slightly higher than outdoor.
Salt spray-proof model
Moist tropical and equatorial climate. Corrosive atmosphere.

Bases SI

SI 14 AND PARTITION



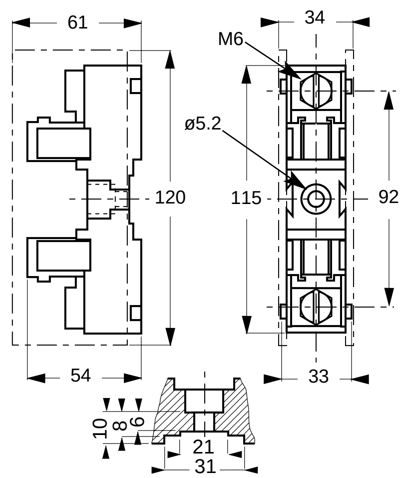
For direct mounting, screw tightening torque = 0.24 mdaN

Code	Ref. Number	Weight (g)	Packaging
SI 14 UR	V 097124	85	3 pieces
SKI 14	B 097130	100	3 pieces-

SI: basic model - SK salt spray-proof model

Désignation cloison	Ref. Number	Weight (g)	Packaging
E 14 - 22	B 097107	13	2 pieces

SI 22 AND PARTITION



For direct mounting, screw tightening torque = 0.3 mdaN

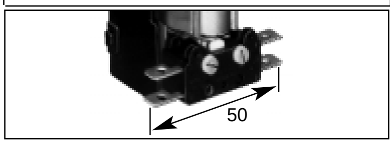
Code	Ref. Number	Weight (g)	Packaging
SI 22 UR	W 097125	160	3 pieces
SKI 22	C 097131	190	3 pieces

SI: basic model - SK salt spray-proof model

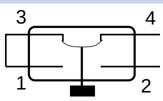
Code partition	Ref. Number	Weight (g)	Packaging
E 14 - 22	B 097107	13	2 pieces

REMOTE SENSING MICROSWITCH

Microswitch type for SI 14	Code	Ref. Number	Weight (g)	Packaging
Basic single microswitch salt spray-proof single microswitch	MC 1-5 14 FL 1-5 MCK 1-5 14 FL 1-5	D 096051 T 097215	20 20	1 piece 1 piece
Basic twin microswitch	MC 1-5 14 FL 1-9	P 096061	40	1 piece
Microswitch type for SI 22	**Code**	**Ref. Number**	**Weight (g)**	**Packaging**
Basic single microswitch salt spray-proof single microswitch	MC 1-5 22 FL 1-5 MCK 1-5 22 FL 1-5	H 096055 R 097213	24 22	1 piece 1 piece
Basic twin microswitch	MC 1-5 22 FL 1-9	T 096065	40	1 piece



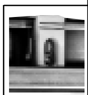
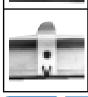
Feasible mounting after connecting on model without partition



With hand-made resetting reversing style microswitch
10A - 250V ~ @ cos φ = 0.3

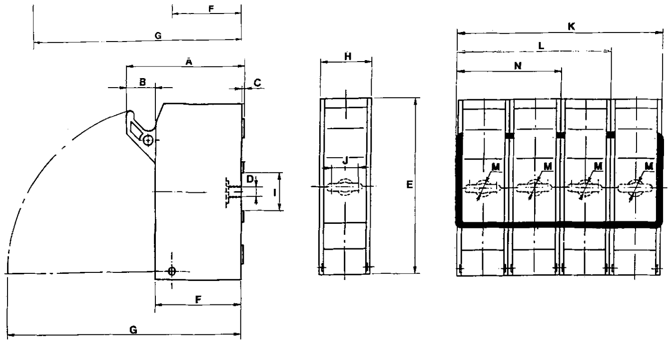
#1 and 3 terminals must always be connected.

ADAPTERS FOR DIN-RAIL MOUNTING

	Rail style	Code	Ref. Number	Top part	Bottom part	Color	Weight (g)	Pkg.
	Asymmetrical DIN EN 50035	EF 4 EF 35 EF 46	L 097047 G 097043 K 097046	vis M 4 vis M 3 vis M 4	 vis M 5 vis M 6	blue cream white	4 4 4	100 100 100
	Symmetrical DIN EN 50022	Fixoméga FM4	B 092093	M 4 center screw		stainless steel	4.4	10

Modular fuse holders

CC



	CC8/10	CC.14	CC.22
A	40	62	71
B	9	15,5	16
C	2	1	1
D	5,5	7,25	7,25
E	77,5	94	106
F	33	45,5	55
G	100	127	148
H	17,5	27	34
I	46	20,3	20,3
J	-	15,2	18
K	77,5	112	139
L	60	85	105
M	42,5	6	6
N	-	58	71

- Fixation by screw or on symmetrical DIN rail.
- Cable size
  - CC8/CC10; 32A 1x10 mm²
  - CC14; 50A 1x25 mm²
  - CC22; 125A 1x50 mm²





E215146



Y212081

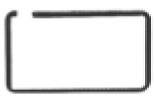


D200770



N216166

Poles	CATALOG NUMBER		REFERENCE NUMBER		N. mod. (17,5 mm)	Packing
	Fixation by screw	Fixation rail	Fixation by screw	Fixation rail		
CC.8: Fuse 8x31 / In max: 25A ; Vn max: 400V						
1	23002	23102	E215146	M218212	1	12
N	23000	23100	Y214634	C217697	1	12
1 + N	23010	23110	G215654	Q219250	2	6
2	23012	23112	L216164	R219780	2	6
3	23014	23114	L216670	C222458	3	4
3 + N	23018	23118	Z217188	V222980	4	3
CC.10: Fuse 10x38 / In max: 32A ; Vn max: 500V						
1	23202	23302	S211570	F215147	1	12
N	23200	23300	Y211046	W214126	1	12
1 + N	23210	23310	Y212081	M216165	2	6
2	23212	23312	N212601	M216671	2	6
3	23214	23314	A213118	A217189	3	4
3 + N	23218	23318	S213617	D217698	4	3
CC.14: Fuse 14x51 / In max: 50A ; Vn max: 690V						
1	23402	23502	S219781	Z211047	1,5	12
N	23400	23500	R219251	C201827	1,5	12
1 + N	23410	23510	D222459	T211571	3	6
2	23412	23512	W222981	Z212082	3	6
3	23414	23514	D200770	P212602	4,5	4
3 + N	23418	23518	V201314	B213119	6	3
CC.22: Fuse 22x58 / In max: 125A ; Vn max: 690V						
1	23602	23702	X214127	B217190	2	6
N	23600	23700	T213618	N216672	2	6
1 + N	23610	23710	A214636	E217699	4	3
2	23612	23712	G215148	P218214	4	3
3	23614	23714	J215656	C218732	6	2
3 + N	23618	23718	N216166	S219252	8	1



D201828



A211048

Accessories

	Poles	CAT. NUMBER CC.8	CAT. NUMBER CC.10	CAT. NUMBER CC.14	CAT. NUMBER CC.22	Packing
Handle assembly	2	23934	23934	23941	23948	10
	3	23935	23935	23942	23949	10
	4	23936	23936	23943	23950	10
Symmetrical rail adapter	1	23937	23937	23951	23951	10

Accessories

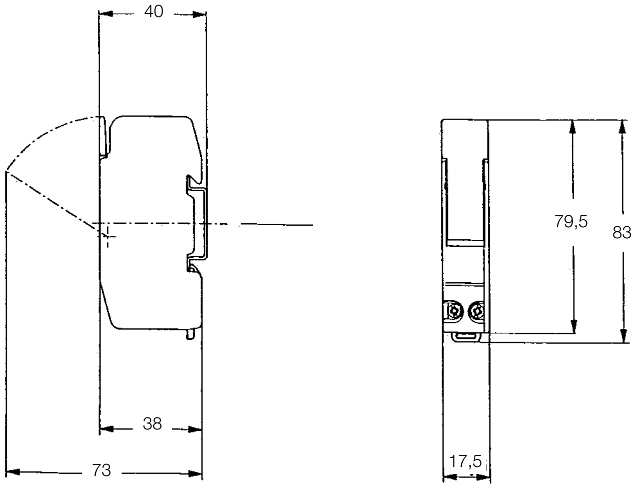
	Poles	REF. NUMBER CC.8	REF. NUMBER CC.10	REF. NUMBER CC.14	REF. NUMBER CC.22	Packing
Handle assembly	2	E200771	E200771	C213120	P216167	10
	3	W201315	W201315	V213619	P216673	10
	4	D201828	D201828	Y214128	C217191	10
Symmetrical rail adapter	1	A211048	A211048	F217700	F217700	10

Standards: IEC 269-2-1 / 947-3, NFC 63.210-63.001, UNE 21.103-2-1
Approvals: Bureau Veritas / Lloyd´s Register of Shipping

Fuses: See General Purpose Fuses, French Ferrule

Modular fuse holders

CCR



- Cable size: 1 x 10mm².
- **Compact dimensions.**
- IP20



C200769



H215655

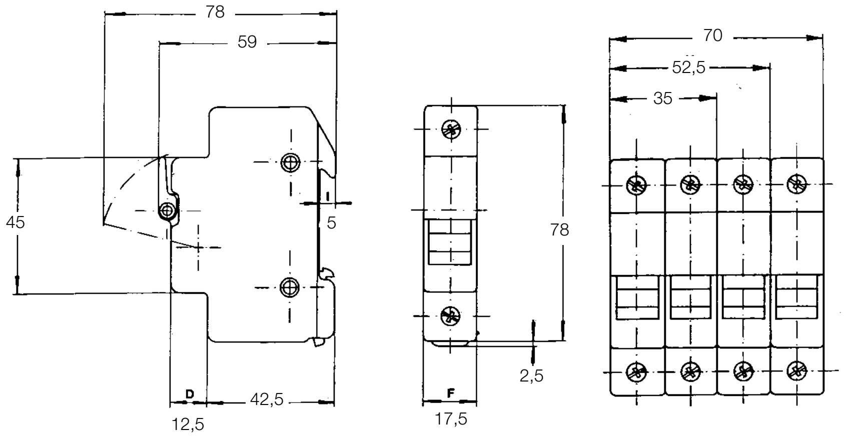
Poles	CATALOG NUMBER	REFERENCE NUMBER	N. Mod. (17.5 mm)	Packing
CCR.8: Fuse 8x31 In max: 25A ; Vn max: 400V				
1	23132	C200769	1	12
1 + N	23106	A218730	1	12
N	23301	Z214635	1	12
CCR.10: Fuse 10x38 In max: 32A ; Vn max: 500V				
1	23332	N218213	1	12
1 + N	23306	H215655	1	12
N	23301	Z214635	1	12

Standards: IEC 269-2-1, IEC 269-3-1, IEC 947-3, NFC 63.210-63.001, UNE 21.103-2-1
Approvals: NF-USE

Fuses: See General Purpose Fuses, French Ferrule

French Ferrule Fuses

Modular fuse holders MSC



- Blown fuse indicator (120/690V)
- Cable size:
  - unipolar: 1 x 16mm²
  - unipolar + neutre: 1 x 10 mm²
- Provision for locking in versions without indicator.
- IP20

MSC 8:Fuse 8x31

In max: 25A ; Vn max: 400V


W213620

Poles	CATALOG NUMBER Standard	CATALOG NUMBER + indicator	REFERENCE NUMBER Standard	REFERENCE NUMBER + indicator	N. Mod. (17,5 mm)	Packing
1	24002	24004	T219253	F222461	1	12
1 + N	24010		B211049		2	6
2	24012		R212604		2	6
3	24014		W213620		3	4
3 + N	24016		C214638		4	3
4	24019		Q216168		4	3
N	24000		Q218215		1	12

Phase + neutral (1mod.)


X201316

Poles	CATALOG NUMBER Standard	CATALOG NUMBER + indicator	REFERENCE NUMBER Standard	REFERENCE NUMBER + indicator	N. Mod. (17,5 mm)	Packing
1 + N	24006	24008	F200772	X201316	1	12
3 + N	24018		J215150		3	4

MSC 10: Fuse 10x38

In max: 32A; Vn max: 690V


W219784

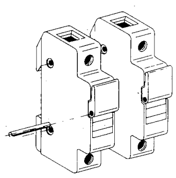
Poles	CATALOG NUMBER Standard	CATALOG NUMBER + indicator	REFERENCE NUMBER Standard	REFERENCE NUMBER + indicator	N. Mod. (17,5 mm)	Packing
1	24202	24204	Q216674	W219784	1	12
1 + N	24210		C212085		2	6
2	24212	24213	E213122	K215151	2	6
3	24214		M215659		3	4
3 + N	24216		E217193		4	3
4	24219		F218735		4	3
N	24000		Q218215		1	12

Phase + neutral (1mod.)


Y201317

Poles	CATALOG NUMBER Standard	CATALOG NUMBER + indicator	REFERENCE NUMBER Standard	REFERENCE NUMBER + indicator	N. Mod. (17,5 mm)	Packing
1 + N	24206	24208	Y201317	C211050	2	12
3 + N	24218		S218217		3	4

Assembly pin



Poles	CATALOG NUMBER	REFERENCE NUMBER	Packing
2	14030	G215125	10
3	14031	Q216145	10
4	14032	A217166	10

Standards: IEC 269-2-1/947, NFC 63.001/63.210, UNE 21103-2-1, 269-2-1, 947-3
Approvals: Bureau Veritas / Lloyd´s Register of Shipping

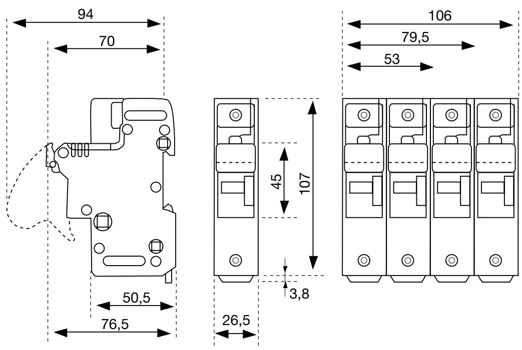
Fuses: See General Purpose Fuses, French Ferrule

Blocks & Holders

French Ferrule Fuses

Modular fuse holders CMS

New



- Indicator for fuse melts and/or striker (120/690V)
- Clip for rail mounting in two positions
- Cable size max. 35 mm ²
- Provision for locking
- IP 20



J211056

CMS 14: Fuse 14x51

In max: 50A; Vn max: 690V

Poles	CATALOG NUMBER				REFERENCE NUMBER				Nº Mod. (17.5 mm)	Packing
	Standard	+ Indicator	+ Microswitch	Micro + ind.	Standard	+ Indicator	+ Microswitch	Micro + ind.		
N	29000				N222468				1,5	6
1	29002	29004	29020	29120	F222990	M200778	K214645	N201837	1,5	6
1 + N	29010	29011			E201323	M201836			3	3
2	29012	29013	29021	29121	J211056	C211579	R215157	K211057	3	3
3	29014	29015	29024	29124	J212091	Z212611	T215665	D211580	4,5	2
3*			29025 *	29125 *			Y216681 *	K212092 *	6	1
3 + N	29016	29017	29026	29126	L213128	D213627	L217199	A212612	6	1
4	29019				G214136				6	1

* 2 microswitches



P217708

Unipolar fuse holder for accessories (**)

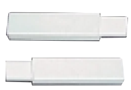
Function	CATALOG NUMBER	REFERENCE NUMBER	Nº Mod. (17.5 mm)	Packing
Blown fuse, fuse presence, prebreaking	29030	P217708	1,5	6
Blown fuse only	29031	L223524	1,5	6

(**) Enables installation of accessory microswitch and/or indicator

Accessories (***)



M218741



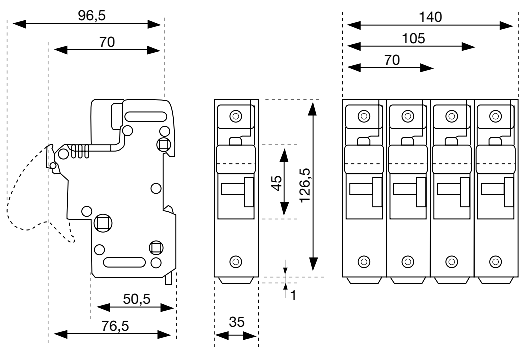
F213629

Description	CATALOG NUMBER	REFERENCE NUMBER	Nº Mod. (17.5 mm)	Packing
Micro Kit 1P	29051	M218741	1,5	1
Micro Block 3P	29052	C219261	4,5	1
Block 2 Micro 3P	29053	D219791	4,5	1
Micro assembly pins	29265	J214138		10
Micro enlargement pin	29264	F213629		10
Fuse holder assembly pins	29050	Z218223		10
Indicator	29054	-		1
Lock	29057	M223525		1

(***) See technical features for mounting information

Standards: IEC 269-2-1 / 947-3

Modular fuse holders CMS



- Indicator for fuse melts and/or striker (120/690V)
- Clip for rail mounting in two positions
- Cable size max. 50 mm ²
- Provision for locking
- IP 20



D219262



P201838

CMS 22: Fuse 22x58

In max: 125A; Vn max: 690V

Poles	Catalog Number				Reference Number				Nº Mod. (17.5 mm)	Packing
	Standard	+ Indicator	+ Microswitch	Micro + ind.	Standard	+ Indicator	+ Microswitch	Micro + ind.		
N	29200				M213129				1,5	6
1	29202	29204	29220	29320	E213628	H214137	D219262	A216683	1,5	6
1 + N	29210	29211			L214646	S215158			3	3
2	29212	29213	29221	29321	V215666	Z216176	E219792	N217201	3	3
3	29214	29215	29224	29324	Z216682	M217200	Q222470	R217710	4,5	2
3*			29225 *	29325 *			H222992 *	B218225 *	6	1
3 + N	29216	29217	29226	29326	Q217709	A218224	P200780	P218743	6	1
4	29219				N218742				6	1

* 2 microswitches

Unipolar fuse holder for accessories (**)

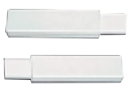
Function	CATALOG NUMBER	REFERENCE NUMBER	Nº Mod. (17.5 mm)	Packing
Blown fuse, fuse presence, prebreaking	29230	G201325	1,5	6
Blown fuse only	29231	P201838	1,5	6

(**) Enables installation of accessory microswitch and/or indicator

Accessories (***)



E211581



F213629

Description	CATALOG NUMBER	REFERENCE NUMBER	Nº Mod. (17.5 mm)	Packing
Micro Kit 1P	29251	E211581	1,5	1
Micro Block 3P	29252	L212093	4,5	1
Block 2 micro 3P	29253	B212613	4,5	1
Micro assembly pins	29265	J214138		10
Micro enlargement pin	29264	F213629		10
Fuse holder assembly pins	29250	L211058		10
Indicator	29054	-		1
Lock	29057	M223525		1

(***) See technical features for mounting information

Standards: IEC 269-2-1 / 947-3

French Ferrule Fuses

Technical features - modular fuse holders

Fuse-link table I max. / Vn







	Type	Fuse	In max. 250	400	500	600	690	Torque Maxi N.m.
CC	CC. 8	8 x 31		25A				2
	CC. 10	10 x 38		32A	25A			2
	CC. 14	14 x 51		50A	32A		25A	3,5
	CC. 22	22 x 58		125A	100A		80A	4
CCR	CCR. 8	8 x 31		25A				2
	CCR. 10	10 x 38		32A	25A			
MSC	MSC. 8	8 x 31		25A				2
	MSC. 10	10 x 38		32A	25A			
MSD	MSD (8x23)	8 x 23	10A					
	MSD (8x31)	8 x 31		20A				
	MSD (10x25)	10 x 25	16A					2
	MSD (10x31)	10 x 31		25A				
	MSD (10x38)	10 x 38		32A				
CMS	CMS. 14	14 x 51		50A	32A		25A	3,5
	CMS. 22	22 x 58		125A	100A		80A	4,5
MSM	MSM	5 x 20	16A					2

Application coefficient of multipolar fuse-links

N. mod (17,5 mm)	Fuse-link I max.
1 - 2 - 3	In
4 - 5 - 6	0,8 x In
7 - 8 - 9	0,7 x In
> 10	0,6 x In

Correction of available current based on temperature

Temperature	Available x In
20° C	1
30° C	0,95
40° C	0,9
50° C	0,8

Blocks & Holders

French Ferrule Fuses

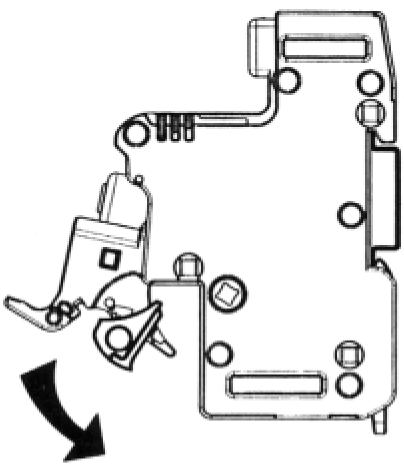
Technical features - CMS

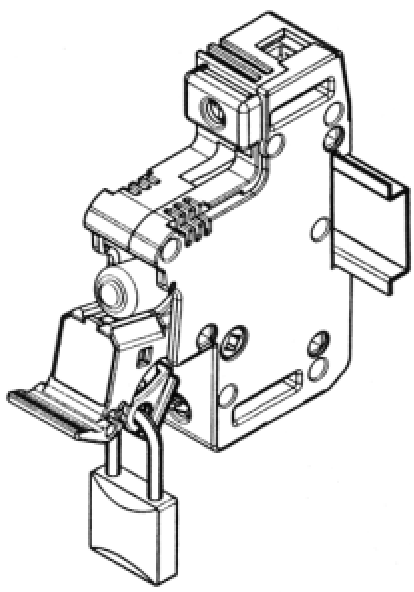
Table of electrical characteristics

	Rating UN(V)	UImp (kV)	Fuse current rating IN(A)	Maximim fuse operating current (A)				Recom-mended copper wire size (mm2)	Torque Maxi N.m.
				gG	aM	gRC	UR		
			0,25	0,25	0,25				
			0,5						
			1						
			2						
			4						
			6						
			8						
CMS 14	690	8	10			10	10		3,5
			12			12	12		
			16			16	16	2,5	
			20			20	20	2,5	
			25			25	20	4	
			32			32	25	6	
			40	40	40	30	30	6	
			50	50	50	38	35	10	
			1	↓	1				
			2						
			4						
			6						
			8						
			10						
			12						
			16						
CMS 22	690	8	20			20	20	4	4
			25			25	25	6	
			32			32	42	10	
			40			40	40	10	
			50			50	50	10	
			63			51	63	16	
			80			64	60	25	
			100		100	74	70	35	
			125		100			35	

Lock installation

Reference Number M223525

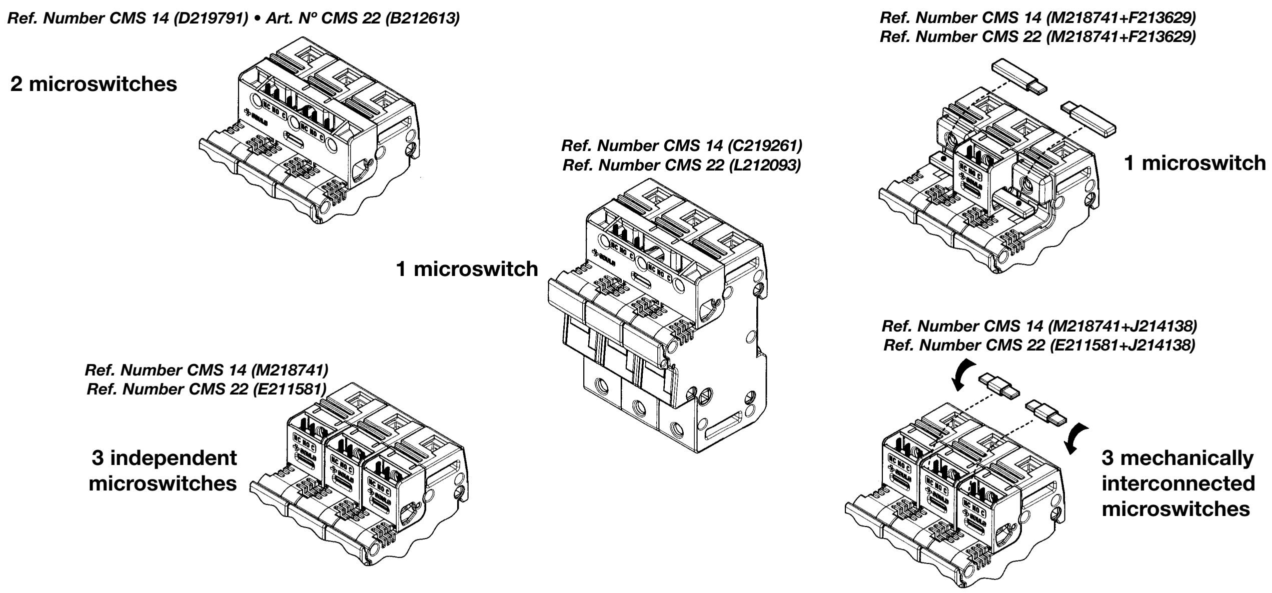




French Ferrule Fuses

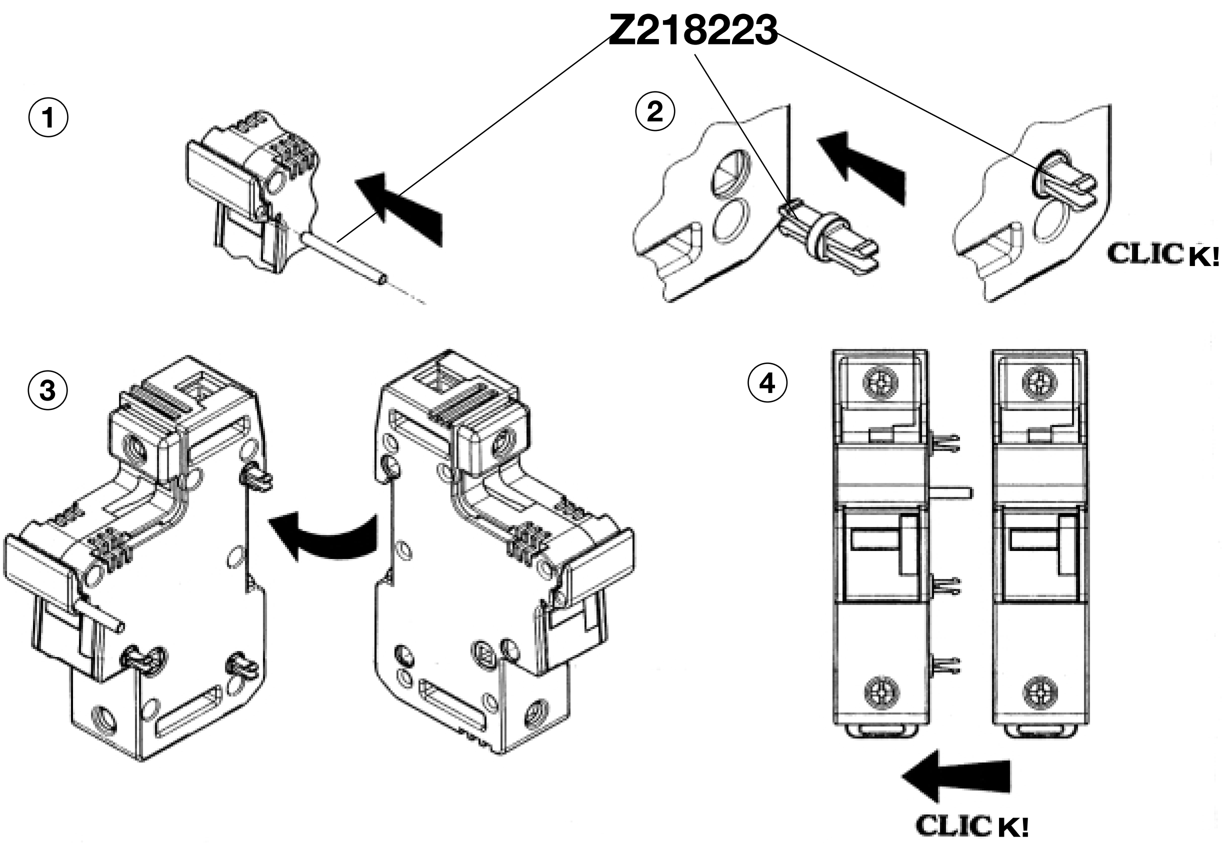
Technical features - CMS

Microswitch options



Fuse holder assembly

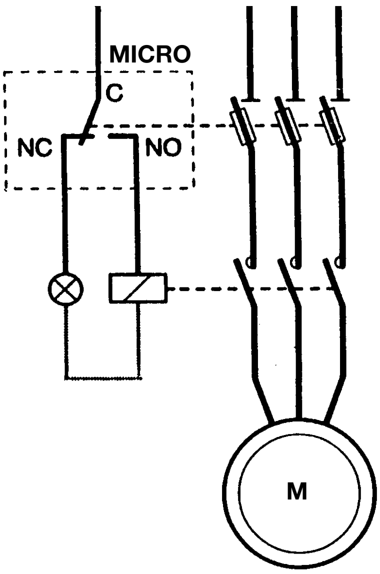
Ref. Number CMS 14/22 (Z218223)



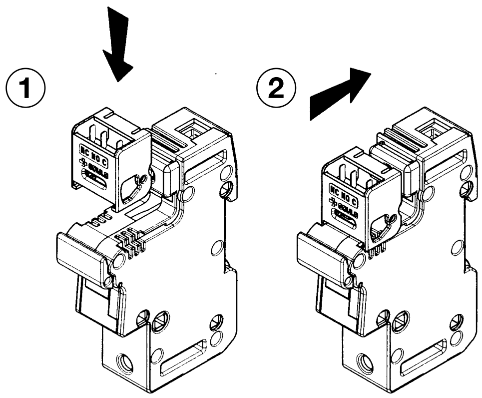
Technical features - CMS

Microswitch mounting instructions (*)

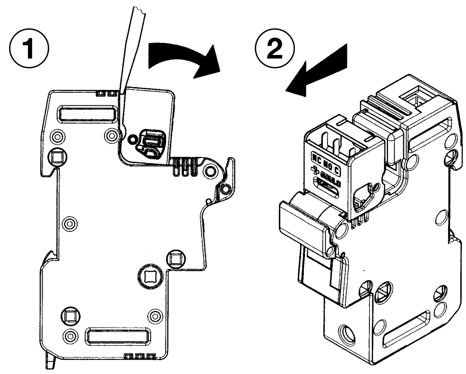
Reference Number CMS 14 (M218741 / C219261 / D219791)
Reference Number CMS 22 (E211581 / L212093 / B212613)



Assembly



Disassembly



(*)Microswitch functions

Blown fuse: Fuse holder containing fuse with striker sends message when fuse blown

Prebreaking: When fuse holder opens

Presence: Sends message or not depending on fuse presence

Auxilliary microswitch caracteristics

Minimum voltage and current for operation: 10VAC/DC 100mA

Nominal current and interrupting rating(1) at 250V	6A	AC12
	3A	AC13
	0,3A	AC14
	0,1A	DC12/13/14
Nominal current and interrupting rating(1) at 2 and 24 V	6A	DC12/DC13
	5A	AC13
	2A	AC14/DC13
	0,6A	DC14

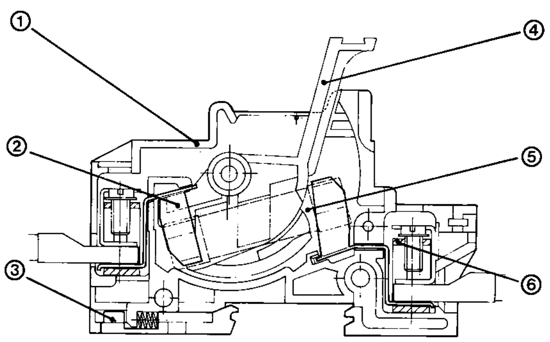
(1) According IEC947-5 standard

Modular fuse holders MS

MS Modular fuse base

for industrial cylindrical fuse-links

Note:
In 2001, these products will be cross-referenced to MSC10, CMS14 and CMS22 (see previous pages)



1 Base
2 Contact
3 Slide
4 Handle
5 Fuse-link
6 Bolt

Material:
Handle: Thermal polyester (PU)
Base: Highly temperature resistant polyamide.
Self-extinguishable.
Contacts: Silver-plated.
Protection Index: IP 20
Live parts inaccessible.

MS fuse holder operations
with:
- Fuse indicator (250/690V~)
  Indicator lights up when:
  - Fuse melts
  - No fuse-link
- Reversing microswitch 5A-250V~
  The microswitch operates:
  - When fuse-link absent
  - When fuse base open
  - By trip-indicator action

Type	Fuse base In. (*)	Fuse-link	Fuse-link max.		
			400 V~	500 V~	690 V~
MS. 10	32A	10 x 38	32A	25A	-
MS. 14	50A	14 x 51	50A	40A	25A
MS. 22	125A	22 x 58	125A	100A	80A

(*) In intermitent operation
Do not open under load

Standards:
CEI 269-2-1, 947-3
NFC 63210 - 63001
VDE 0636 - 1
UNE 20129 - 21103

Approvals:
Lloyd's Register of Shipping
Bureau Veritas

Modular fuse holders

MS

MS Modular fuse base for industrial cylindrical fuse-links

Note:
In 2001, these products will be cross-referenced to MSC10, CMS14 and CMS22 (see previous pages)



X219785



G201831



A222985

MS. 10: 32A: 690V~

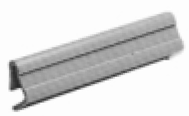
Fuse-link size: 10 x 38
32 A:400 V~ 25 A:500 V~

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	24602	X219785	1	12
(*) N	24600	W219255	1	12
(*) 1 + N	24610	H200774	2	6
2	24612	Z201318	2	6
3	24614	G201831	3	4
(*) 3 + N	24616	D211051	4	3
4	24619	X211574	4	3

(*) With neutral incorporated

With indicator

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	24604	A222985	1	12



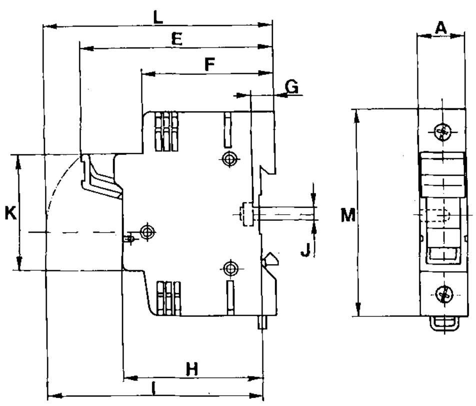
T212606

Accessories

Profile for assembling no. of poles

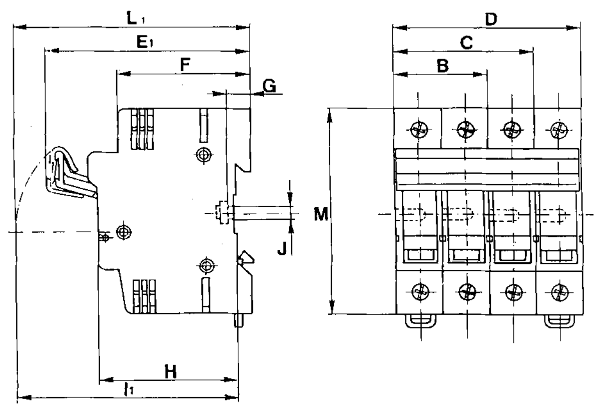
Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
2	24730	D212086		10
3	24731	T212606		10
4	24732	F213123		10
300 mm	24733	Y213622		10

Unipolar



	MS10
A	17,5
B	35
C	52,5
D	70
E	73,5
E_1	75,5
F	50
G	9
H	52
I_1	83
I	8,5
J	5
K	45
L	89
L_1	91
M	78

Multipolar



Modular fuse holders — MS

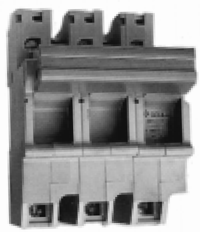
MS Modular fuse base

for industrial cylindrical fuse-links

Note:
In 2001, these products will be cross-referenced to MSC10,CMS14 and CMS22 (see previous pages)



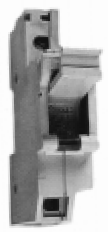
L215152



B222986



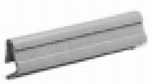
G213124



J217703



K217704



G217195

MS. 14 50A:690V~

Fuse-link size: 14 x 51
50 A:400 V~ 40 A:500 V~ 25 A:690 V~

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	24802	L215152	1,5	6
(*) N	24800	B214131	1,5	6
(*) 1 + N	24810	T218218	3	3
2	24812	X219256	3	3
3	24814	B222986	4,5	2
(*) 3 + N	24816	Y211575	6	1
4	24819	V212607	6	1

With indicator

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	24804	J217703	1,5	6

With microswitch (5 A / 250 V~)

Supplied with 3 terminals

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	24820	G213124	1,5	6
3	24824	C214132	1,5	2
(*) 3 + N	24826	M215153	6	1

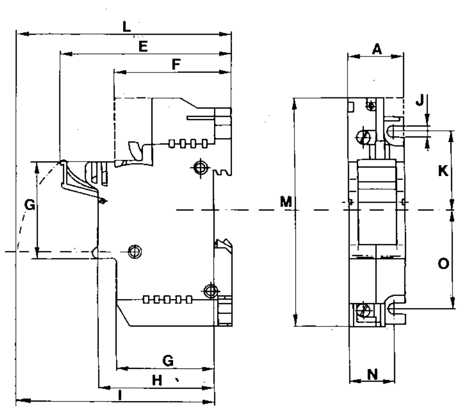
Accessories

Profile for assembling no. of poles

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
2	24930	P215661		10
3	24931	T216677		10
4	24932	G217195		10
300 mm	24733	Y213622		10
Microswitch 5 A - 250 V~	24934	K217704		5

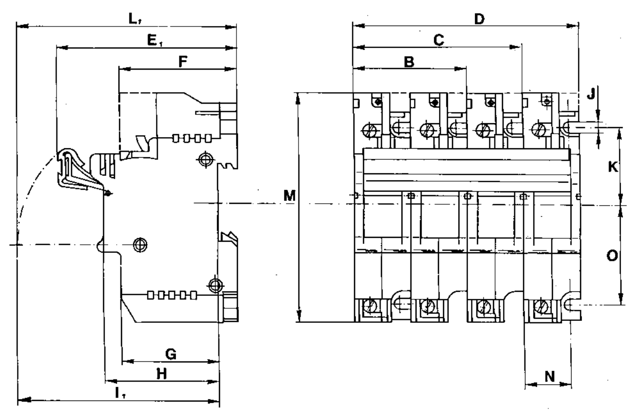
(*) With neutral incorporated

Unipolar



	MS14
A	26
B	52
C	78
D	104
E	81
E_1	83
F	53,5
G	44,5
H	52,6
I	89
I_1	91
J	5
K	32,5
L	98
L_1	100
M	106
N	21
O	43,8

Multipolar



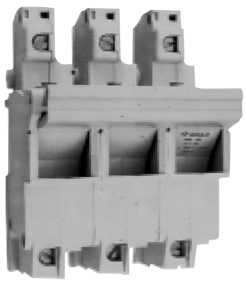
French Ferrule Fuses

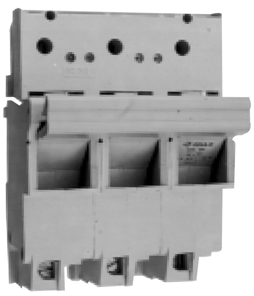
Modular Fuseholders — MS

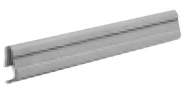
MS Modular fuse base
for industrial cylindrical fuse-links

Note:
In 2001, these products will be cross-referenced to MSC10, CMS14 and CMS22 (see previous pages)


C222987


D214133


J218738


G217195


G211054

MS. 22 125A:690V~

Fuse-link size: 22 x 58
125 A:400 V~ 100 A: 500 V~ 80 A: 690 V~

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	25002	C222987	2	6
(*) N	25000	Z219787	2	6
(*) 1 + N	25010	Z211576	4	3
2	25012	W212608	4	3
3	25014	D214133	6	2
(*) 3 + N	25016	V216172	8	1
4	25019	H217196	8	1

With microswitch (5 A / 250 V~)

Supplied with 3 terminals)

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
1	25020	L217705	2	6
3	25024	J218738	6	2
(*) 3 + N	25026	A219788	8	1

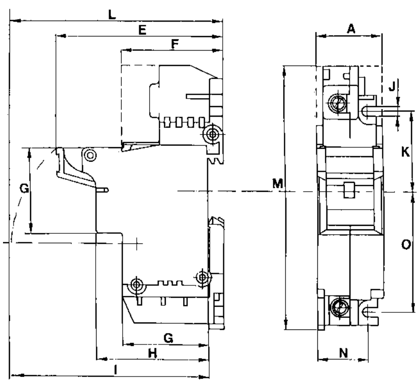
Accessories

Profile for assembling no. of poles

Poles	CATALOG NUMBER	REFERENCE NUMBER	No. of modules (17.5 mm)	Packing
2	25130	L222466		10
3	25131	K200776		10
4	25132	C201321		10
300 mm	25133	K201834		10
Microswitch 5 A - 250 V~	25134	G211054		5

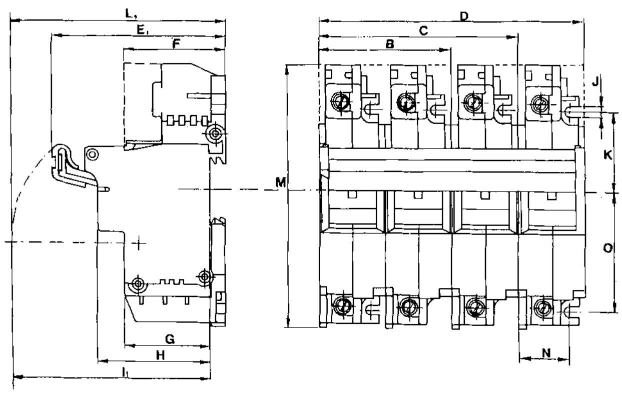
(*) With neutral incorporated

Unipolar



	MS 22
A	35
B	70
C	105
D	140
E	88
E1	90
F	53
G	45
H	58
I	103
I1	105
J	4,5
K	45
L	112
L1	114
M	140
N	26,5
O	63

Multipolar



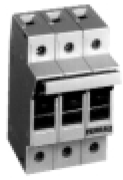
Ferraz Shawmut

Fuse disconnectors ST

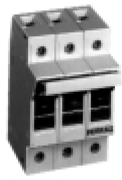
ST FUSE DISCONNECTORS FOR FERRULE-TYPE FUSES SIZES: 8 - 10 - 14 - 22

- IN ACCORDANCE WITH IEC 947-3 AND EN 60947-3
  OPERATION CLASS: AC20B
  IMPULSE WITHSTAND VOLTAGE:
  6 AND 8 kV (1.2/50 μs wave)
- WITH PRE-ISOLATING AND BLOWN-FUSE INDICATING MICROSWITCHES
- COMPLETE PROTECTION AGAINST TOUCHING OF LIVE PARTS
- PROTECTION DEGREE: IP 2X
- HIGH-PERFORMANCE ST RANGE COMPLIANT WITH THE NEW EUROPEAN VOLTAGE RATINGS (IEC 33) U_N 480-690 V AC/DC I_N UP TO 125 A

ST 8 III



ST 10 III



ST 14 IIIN



ST 22



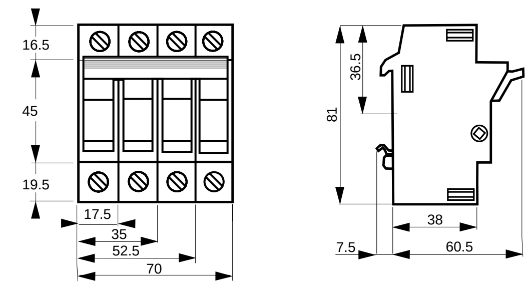
MAIN CHARACTERISTICS

Size	AC Insulation voltage rating Ui (V) AC/DC	Impulse withstand voltage Uimp (kV)(1)	Current rating I_N(A)	Fuse current rating I_N(A)	Maximum fuse operating current (A) gG	aM	gR/UR			gL	Recommended copper wire gauge (mm^2)	Fire and fumes class NF F 16-102
							URD/URC	URGB/URGA	gRC / gRB			
ST 8	480	6	20	10 16 20	10 16 20	10					1.5 2.0 2.5	I3-F3
ST 10	690 (CEI) 700 (US)	6	32	25 30 32	25 30	25 30			gRB 27		4 4 6	
ST 14	690 (CEI) 700 (US)	8	50	16 20 25 32 40 50 63	16 20 25 32 40 40	16 20 25 32 40 50	16 18 20 25 30 37 41	16 18 20 25 30 38	gRC 16 18 20 25 30 37	16 20 25 29 35 40	2.5 2.5 2.5 4 6 10 10	I3-F2
ST 22	690 (CEI) 700 (US)	8	125	25 32 40 50 63 80 100 125 135	25 32 40 50 63 80 100 110	25 32 40 50 63 80 100 125	25 29 35 40 52 65 76 85 87	25 29 35 40 51 64 74	25 29 35 40 52 65 76	25 32 40 50 63 75 85	4 6 10 10 16 16 25 25 35	I3-F1

All terminals silver-plated copper
(1) Between close phases and phase and mass, between phases and microswitch as per IEC 947-1

Fuse disconnectors — ST

ST 8 (for 8x32 fuses)



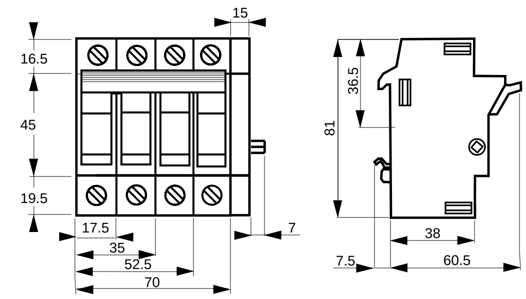
Unmovable screw clamp-type connections for wires:
- one conductor, multistrand or rigid wire: 10 mm^2
- two conductors, multistrand or rigid wire: 6 mm^2

Minimal section: 1.5 mm^2
With tightening torque: 1 to 1.2 Nm

Mounting:
- simple snap mounting on standard symmetrical DIN-rail
- direct on board: M4 screw with tightening torque 1 to 1.2 Nm

Poles	Symbol	(1)Indication	(2) Predisconnection	Code	Part #	Approvals	Weight (g)	Packaging
1		Not available		ST8	F 081218		75	12&3
1+N		Not available		ST8 IN	Z 081235		155	6&1
N		Not available		ST810 N	H 081220		80	12&3
2		Not available		ST8 II	A 081236		150	6&1
3		Not available		ST8 III	B 081237		225	4&1
3+N		Not available		ST8 III N	C 081238		305	3&1

ST 10 (for 10x38 fuses without trip-indicator)



Unmovable screw clamp-type connections for wires:
- one conductor, multistrand or rigid wire: 10 mm^2
- two conductors, multistrand or rigid wire: 6 mm^2

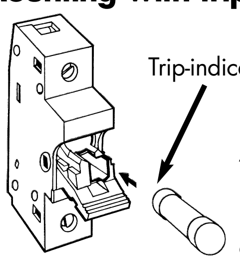
Minimal section: 1.5 mm^2
With tightening torque: 1 to 1.2 Nm

Mounting:
- simple snap mounting on standard symmetrical DIN-rail
- direct on board: M4 screw with tightening torque 1 to 1.2 Nm

Poles	Symbol	(1)Indication	(2) Predisconnection	Code	Part #	Approvals	Weight (g)	Packaging
1		Not available		ST10	G 081219	UR	75	12&3
			●	ST10 FO	S 081252		100	1
1+N				ST10 IN	D 081239	UR	155	6&1
N				ST810 N	H 081220	UR	80	12&3
2				ST10 II	E 081240	UR	150	6&1
			●	ST10 II FO	W 081255		175	1
3				ST10 III	F 081241	UR	225	4&1
			●	ST10 III FO	Z 081258		250	1
3+N				ST10 III N	G 081242	UR	330	3&1
			●	ST10 III NFO	C 081261		355	1

(2) Reversing switch style preisolating contacts (FO model) enabling control of protection device and unclose the off load disconnector.
Contact features see page 4.

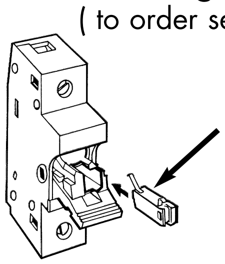
Mounting with trip-indicator fuse



Trip-indicator side

Attention: Do not mount 10x38 fuses with trip indicator in the ST 10 fuse-disconnector (the fuse is not standardized)

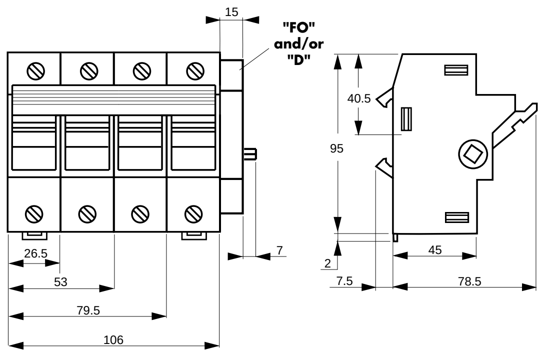
Mounting with indicating light
(to order separately)



STV 400 item. Ref. Number : W 081232 for ST 8 - 10 - 14
Operating voltage : from 115 to 400V
STV 600 item. Ref. Number : Y 081234
for ST 8 - 10 - 14
Operating voltage : from 250 to 600V
Cannot be mounted on disconnectors fitted with microswitches

Fuse disconnectors ST

ST 14 (for 14x51 fuses)



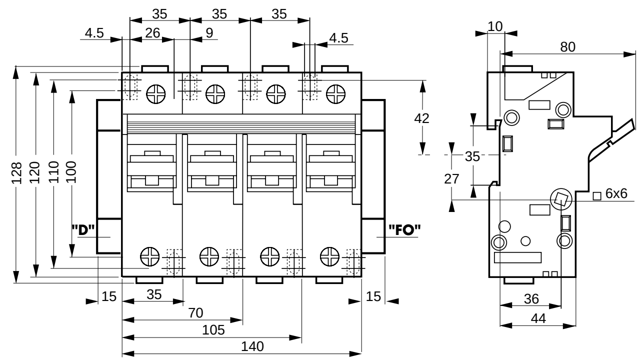
Unmovable screw clamp type connections for wires:
- one conductor, multistrand or rigid wire: 25 mm²
- two conductors, multistrand or rigid wire: 10 mm²

Minimal section: 2.5 mm²
With tightening torque: 1.6 to 2 Nm

Mounting:
- simple snap-mounting on standard symmetrical DIN-rail
- direct on board: M4 screw with tightening torque 1 to 1.2 Nm

Poles	Symbol	(1) Indication	(2) Predisconnection	Code	Part #	Approvals	Weight (g)	Packaging
1				ST14	J 081221	UL	140	12&3
			●	ST14 FO	G 081265		165	1
		●		ST14 D	R 081067		190	1
		●	●	ST14 FOD	B 081398		215	1
1+N				ST14 IN	H 081243		290	6&1
		●		ST14 IND	Y 220131		340	1
		●	●	ST14 INFOD	F 221357		365	1
N				ST14 N	L 081223	UL	150	12&3
2				ST14 II	J 081244	UL	280	6&1
			●	ST14 II FO	K 081268		305	1
		●		ST14 II D	T 081069		330	1
		●	●	ST14 II FOD	E 081401		355	1
3				ST14 III	K 081245	UL	420	4&1
			●	ST14 III FO	N 081271		445	1
		●		ST14 III D	V 081070		470	1
		●	●	ST14 III FOD	J 081428		495	1
3+N				ST14 III N	L 081246	UL	570	3&1
			●	ST14 III NFO	X 081394		595	1
		●		ST14 III ND	W 081071		620	1
		●	●	ST14 III NFOD	P 081548		645	1
4		●	●	ST14 IV FOD	P 205081		645	1

ST 22 (for 22x58 fuses)



Unmovable screw clamp-type connections for wires:
- one conductor, multistrand or rigid wire: 35 mm²
- two conductors, multistrand or rigid wire: 16 mm²
  rigid wire : 25 mm²

Minimal section: 2.5 mm²
With tightening torque: 2.8 to 3.5 Nm

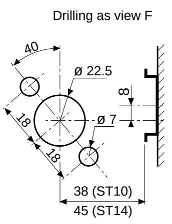
Mounting:
- simple snap-mounting on standard symmetrical DIN-rail
- direct on board: two M4 screws with tightening torque 1 to 1.2 Nm

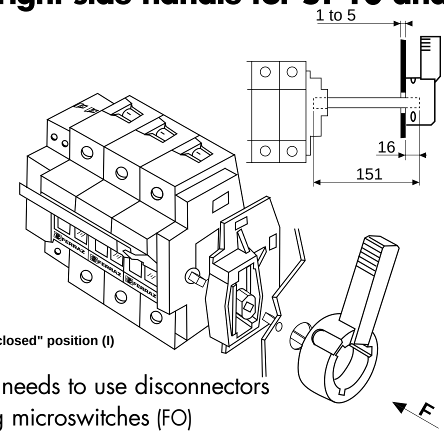
Poles	Symbol	(1) Indication	(2) Predisconnection	Code	Part #	Approvals	Weight (g)	Packaging
1				ST22	F 220368	UL	235	12&3
			●	ST22 FO	M 220397		260	1
		●		ST22 D	N 220398		285	1
		●	●	ST22 FOD	P 220399		310	1
1+N				ST22 IN	D 220389	UL	485	6&1
			●	ST22 INFO	E 220620		510	1
		●		ST22 IND	D 220619		535	1
		●	●	ST22 INFOD	D 220573		560	1
N				ST22 N	E 220367	UL	250	12&3
2				ST22 II	B 220387	UL	470	6&1
			●	ST22 II FO	R 220401		495	1
		●		ST22 II D	S 220402		520	1
		●	●	ST22 II FOD	T 220403		545	1
3				ST22 III	C 220388	UL	705	4&1
			●	ST22 III FO	W 220405		730	1
		●		ST22 III D	X 220406		755	1
		●	●	ST22 III FOD	Y 220407		780	1
3+N				ST22 III N	E 220390	UL	955	3&1
			●	ST22 III NFO	A 220409		980	1
		●		ST22 III ND	B 220410		1005	1
		●	●	ST22 III NFOD	C 220411		1030	1
4		●		ST22 IV D	H 205926		1030	1

(1) Reversing switch-style blown-fuse indication contacts (D model)
(2) Reversing switch-style preisolating contacts (FO model) enabling control of protection device and opening of off load disconnector.
Contact features see page 4.

Fuse-disconnectors ST

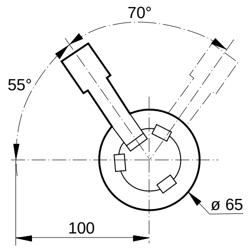
Mounting with right side-handle for ST 10 and ST 14 (Ref. Number F 081264)

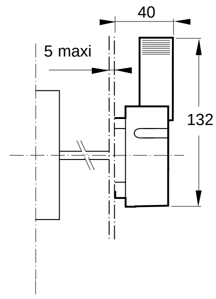




Equipment and handle in "closed" position (I)

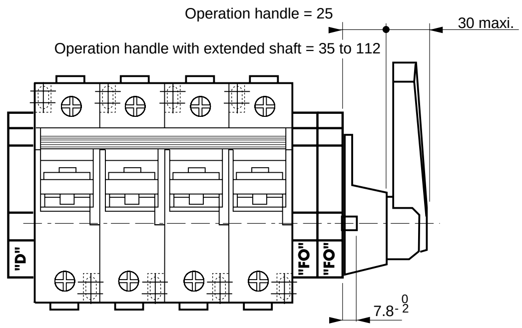
The handle mounting needs to use disconnectors fitted with preisolating microswitches (FO)





Side handle space factor

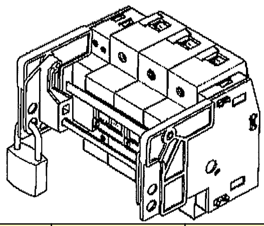
Mounting with a padlocking right side-handle for ST 22



Catalog Number (equipment + handle)	Ref. Number	Qty. of «FO»	Qty. of «D»
ST22 IIIN FOFOD+CDELAT.D.	M 209633	2	1
ST22 IIIN FOFO+CDELAT.D.	N 209634	2	0
ST22 IIIN FOD+CDELAT.D.	P 209635	1	1
ST22 IIIN FO+CDELAT.D.	Q 209636	1	0
ST22 III FOFOD+CDELAT.D.	S 209638	2	1
ST22 III FOFO+CDELAT.D.	R 209637	2	0
ST22 III FOD+CDELAT.D.	T 209639	1	1
ST22 III FO+CDELAT.D.	V 209640	1	0

Padlocking device for ST 10 and ST 14

Use @ 400 V maximum

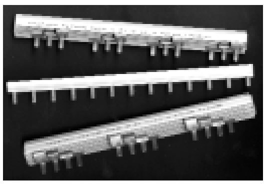


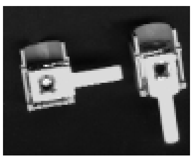
Qty. of poles	Catalog Number	Ref. Number
1[1]	ST CAD 01	H 098493
2[1]	ST CAD 02	J 098494
3	ST CAD 03	K 098495
3+N	ST CAD 04	F 098491

(1) Non-available for ST 10

ST Mounting strip and connecting terminals

Use @ 400 V maximum





Catalog Number	Ref. Number	Max RMS[2]	Packg.
PEIGNE POUR 3 ST8-10 4POLES	X 210309	100	10
PEIGNE POUR 4 ST8-10 3POLES	W 210308	100	10
PEIGNE POUR 6 ST8-10 2POLES	V 210307	63	10
PEIGNE POUR 13 ST8-10 1POLES	T 210306	63	10
PEIGNE POUR 4 ST14 3POLES	A 210312	100	5
PEIGNE POUR 6 ST14 2POLES	Z 210311	63	5
PEIGNE POUR 12 ST14 1POLE	Y 210310	63	5
PEIGNE POUR 6 ST20-22 2POLES	C 210314	150	5
PEIGNE POUR 12 ST20-22 1POLE	B 210313	90	5
BORNE D'ARRIVEE UNI.COTE	E 210316	90	50
BORNE D'ARRIVEE BI-TRI.COTE	G 210318	90	50
BORNE D'ARRIVEE UNI.AXIALE	D 210315	90	50
BORNE D'ARRIVEE BI-TRI.AXIALE	F 210317	90	50

(2) Maximum operating current (A RMS)

Preisolating 'FO" and blown fuse indication 'D" switch characteristics

AC insulation voltage rating (***)	FO or D type	Voltage/current for certain operating	Current rating	Interrupting rating: Current	Non-inductive current 30V	Non-inductive current 110V	Non-inductive current 250V	Inductive circuit : L/R = 25ms 30V	Inductive circuit : L/R = 25ms 110V	Inductive circuit : L/R = 25ms 250V	AC voltage withstand test (*)	Impulse voltage Uimp1.2/50 µs (**)
690 V	«FO»	20 V/50 mA	10 A	50/60 Hz	10 A	10 A	7 A	10 A	8 A	6 A	7.5 kV	8 kV
690 V	«D»	10 V/10 mA	10 A	DC	5 A	0.5 A		1.6 A	0.3 A		7.5 kV	8 kV

	1er FO	2ème FO	D
ST10	12 14 11		
ST14	12 14 11		96 98 95
ST22	12 14 11	32 34 31	22 24 21

open disconnector
Connecting with 6.3 clips

* Between power circuit and microswitch terminals according to IEC 60 and 694 and NFC 64010 (50/60 Hz 1 mn dry air).
** Between power circuit and microswitch terminals Uimp: impulse voltage according to IEC 947-1.
*** Between power circuit and microswitch terminals

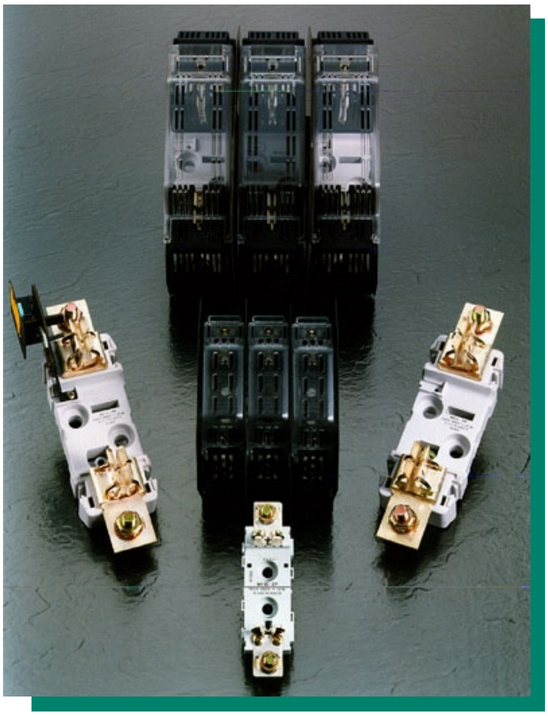
Mounting adapter

Blue colored AF adapter (Ref. Number Q 098500) available for mounting on standard assymetrical DIN-rail (EN 50035) and usable for all models.

Blocks & Holders

NH Fuses

Plastic Bases



CHARACTERISTICS

Thermoplastic base highly temperature resistant and self-extinguishable. Silver-plated contacts with high-contact pressure springs. Multipolar bases are possible by direct linkage in the 00 size and with seperator accessory in sizes 0, 1, 2 and 3. A variety of options available for protecting active parts through the use of accessories: separating plates, separator, cover shields and fuse cover. Dual cable connection system on the 00 size: by screw or clamp. Fixation on rail or by screw.

Lindner NH fuse bases are designed for fuse-links with rated voltages up to ~ 690 V and ~440 V. They are in compliance with IEC 60269, DIN VDE 0636, part 21, 201 and DIN 43620 (dimensions).

Lindner NH fuse bases are available for delivery in single-pole and three-pole designs and can be closely mounted in parallel rows. Each three-pole base is supplied with two phase-partition walls. NH-ISO plug-on covers which clip onto the contact springs can also be supplied for these bases.

Ceramic fuse bases in sizes 00 to 3 (see page 565) are provided with a single-part steatite base, while size 4 has a metal baseplate with 2 ceramic bases. Plastic fuse bases have a single-part plastic base.

The stable silver-plated contact springs are made of electrolytic copper and formed from one piece. Separate springing is provided by highly resilient captive steel springs, making the contact invulnerable to high thermal stress.

Lindner Size 4 NH fuse bases are designed for size 4 fuse-links with 8 mm contact blades. Size 4a fuse bases are designed for size 4a fuse-links with 6 mm contact blades.

690V Polyester fuse bases for NH fuse-links

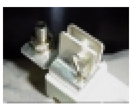
- Polyester insulating bases
- Silver-plated contacts
- High-pressure spring contacts (see picture)
- Screw or rail mount

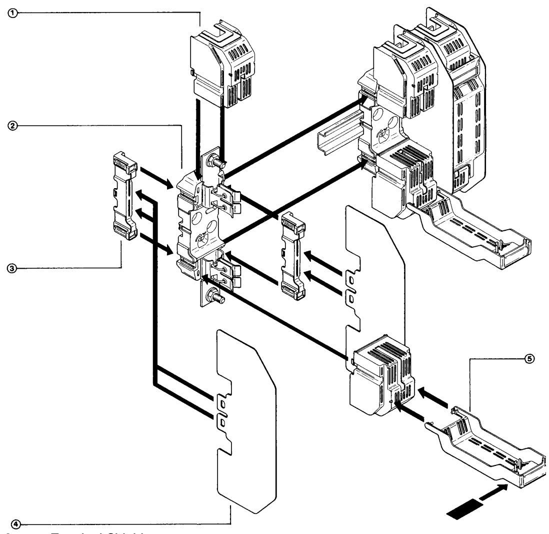
Connection Detail

Type EP



Type PP





1 Terminal Shields
2 NH Fuse Base
3 Separator
4 Insulating Barriers
5 Fuse Shield

Typical NH Polyester Fuse Base Assembly - Exploded View

Plastic Bases

00-EP/TP

Fuse bases for HRC fuse-links NH 690V

Thermoplastic base

Characteristics

- Thermoplastic base highly temperature resistant and self-extinguishable
- Silver-plated contacts with high-contact pressure springs
- Multipolar bases possible by direct linkage in 00 size and with separator accessory in sizes 0, 1, 2 and 3
- Variety of options for protecting active parts through use of accessories: separating plates, separator, cover shields and fuse cover
- Dual cable-connection system on 00 size: by screw or clamp Connecting cable: 50 mm²
- Fixation on rail or by screw

Size 1 fuse bases accept fuses size 0 and 1
Size 2 fuse bases accept fuses size 1 and 2
Size 3 fuse bases accept fuses size 1, 2 and 3
Type EP fuse bases with square contacts
Type PP fuse bases with clip contacts
Fuse bases size 0, 1, 2, 3 must be used with reinforced symmetrical rail, ref. 45550

Type 00-EP* – Fuse bases for NH-00 Fuse-links

POLES	CATALOG NUMBER				REFERENCE NUMBER				PACK.
	SCREW CONNECTOR		CLAMP CONNECTOR		SCREW CONNECTOR		CLAMP CONNECTOR		
	SCREW MT.	RAIL MT.	SCREW MT.	RAIL MT.	SCREW MT.	RAIL MT.	SCREW MT.	RAIL MT.	
1	41002	42002	41102	42102	F215170	R216192	T219805	F200795	3
2	41012	42012	41112	42112	A217212	F218758	D200793	T211594	2
3	41014	42014	41114	42114	F217723	V219277	W201338	C212108	1
4	41019	42019	41119	42119	S219275	Z223007	R211592	M215682	1

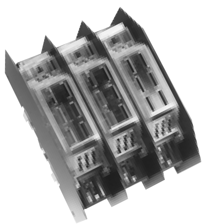
* EP bases have square contacts.



F215170



F217723

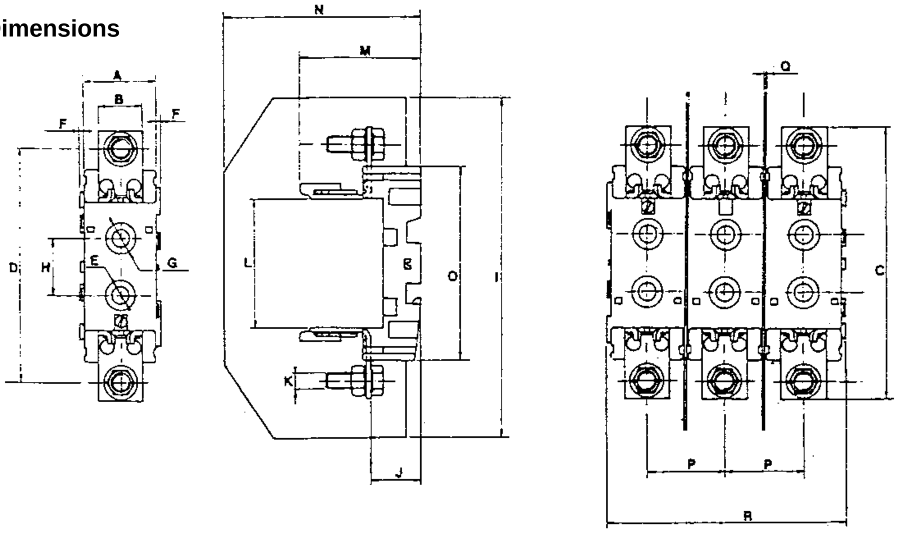


D218756

Type 00-TP IP20 Fuse bases

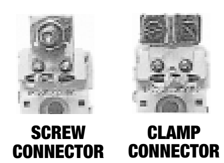
POLES	CATALOG NUMBER				REFERENCE NUMBER				PACK.
	SCREW CONNECTOR		CLAMP CONNECTOR		SCREW CONNECTOR		CLAMP CONNECTOR		
	SCREW MT.	RAIL MT.	SCREW MT.	RAIL MT.	SCREW MT.	RAIL MT.	SCREW MT.	RAIL MT.	
1	41003	42003	41103	42103	M216694	S218240	X223005	D211074	3
3	41015	42015	41115	42115	D218756	G222485	B211072	J215173	1

Dimensions



	NH 00-E
A	32
B	20
C	117
D	100
E	8
F	2
G	14
H	25
I	145
J	21,5
K	8
L	56
M	52
N	85
O	84
P	34
Q	1
R	104

Connection



NH Fuses

Plastic Bases

0-EP - 0 to 3 PP

Type 0-EP* – Fuse Bases for NH-0 Fuse-links

POLES	CATALOG NUMBER		REFERENCE NUMBER		STANDARD PACK
	MOUNTING STYLE		MOUNTING STYLE		
	SCREW	DIN RAIL	SCREW	DIN RAIL	
1	41202	42202	B213142	S216193	3
2	41212	42212	C214661	P216696	2
3	41214	42214	G215171	C217214	1
4	41219	42219	Q216191	J217726	1

* EP bases have square contacts. PP bases have clips contacts.



S216193

Type 0-PP – Fuse Bases for NH-0 Fuse-links

POLES	SCREW	DIN RAIL	SCREW	DIN RAIL	STANDARD PACK
1	41302	42302	N216695	T218241	3
2	41312	42312	B217213	G218759	2
3	41314	42314	G217724	W219278	1
4	41319	42319	R218239	H222486	1



F222484

Type 1-PP – Fuse Bases for NH-1 Fuse-links

POLES	SCREW	DIN RAIL	SCREW	DIN RAIL	STANDARD PACK
1	41402	42402	E218757	A223008	3
2	41412	42412	F222484	G200796	2
3	41414	42414	Y223006	Y201340	1
4	41419	42419	X201339	H201855	1

Type 2-PP – Fuse Bases for NH-2 Fuse-links

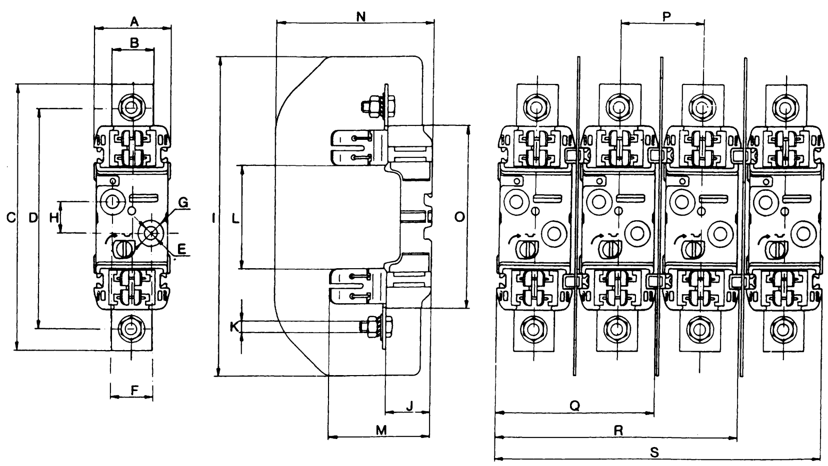
POLES	SCREW	DIN RAIL	SCREW	DIN RAIL	STANDARD PACK
1	41502	42502	F201853	E211075	3
2	41512	42512	S211593	V211595	2
3	41514	42514	B212107	D212109	1
4	41519	42519	C213143	R212627	1



B212107

Type 3-PP – Fuse Bases for NH-3 Fuse-links

POLES	SCREW	DIN RAIL	SCREW	DIN RAIL	STANDARD PACK
1	41602	42602	W213643	X213644	3
2	41612	42612	D214662	B214154	2
3	41614	42614	H215172	F214664	1
4	41619	42619	L215681	K215174	1



Dimensions of Polyester Fuse Bases for NH Fuse-Links

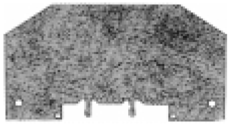
	0-EP	0-PP	1-PP	2-PP	3-PP
A	46	46	60	60	60
B	20	25	32	35	40
C	168	168	209	225	241
D	150.5	150.5	176	201	210
E	7.5	7.5	10.5	10.5	10.5
F	-	-	30	30	30
G	14.5	14.5	20.5	20.5	20.5
H	25	25	25	25	25
I	185	185	250	250	270
J	29	29	35	35	35
K	M8	M8	M10	M10	M12
L	74	75	81	81	81
M	59	61	71	89	103
N	95	95	122.5	122.5	142.5
O	122	122	146	146	146
P	48.5	48.5	65.5	65.5	81.5
Q	94	94	125.5	125.5	141.5
R	142	142	191	191	223
S	190	190	256.5	256.5	304.5

Plastic Bases

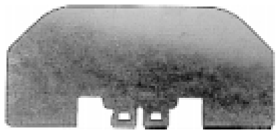
Sizes 00 to 3

Insulating Barriers for Polyester NH Fuse Bases

SIZE	RATED In CURRENT (A)	CATALOG NUMBER	REFERENCE NUMBER	STANDARD PACK
00	100	44502	W212654	2
0	160	44504	Z213669	2
1-2	400	44510	J214690	2
3	630	44512	Q215708	2



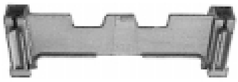
W212654



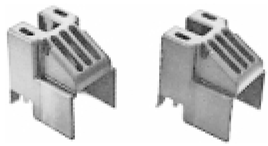
J214690

Separators

0		44604	V216724	2
1-2		44610	N217753	2
3		44612	M218787	2



N217753



M222513

Fuse Shields

00		44802	G213170	3
0		44804	F214181	3
1-2		44810	K214691	3
3		44812	R215709	3

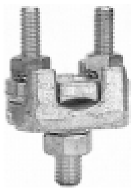
G213170

Terminal Shields

00		44702	M222513	6
0		44704	K200822	6
1		44702	M222513	6
2		44710	Y211621	6
3		44712	X212655	6

One Cable – Terminal for NH Bases

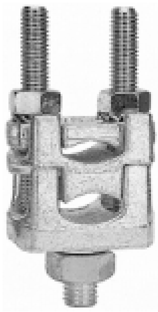
BASE SIZE	CABLE SIZE (mm) MAX.	MIN.	CATALOG NUMBER	REFERENCE NUMBER	STANDARD PACK
00	50	6	45421	Q217755	60
00-0	95	10	45423	A218270	50
1	150	16	45425	N218788	30
2-3	240	50	45427	A219305	15



N218788

Two Cables – Terminal for NH Bases

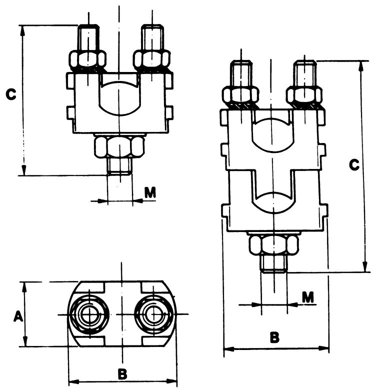
BASE SIZE	CABLE 1 (Size mm) MAX.	CABLE 1 MIN.	CABLE 2 (Size mm) MAX.	CABLE 2 MIN.	CATALOG NUMBER	REFERENCE NUMBER	STANDARD PACK
00	50	6	50	6	45431	B219835	60
00-0	95	10	95	10	45433	P222515	30
1	150	25	150	16	45435	F223036	20
2-3	240	95	240	50	45437	B201366	5



F223036

Dimensions of Terminals

CATALOG NUMBER	A	B	C	M
45421	18	26	34	6
45423	24	35	52	8
45425	26	41	58	10
45427	36	53	68	12
45431	18	26	39	6
45433	24	35	82	8
45435	26	41	84	10
45437	36	53	98	12



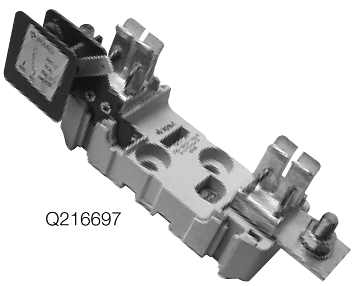
Blocks & Holders

NH Fuses

Plastic Bases

Sizes 00 to 3

Fuse bases 690V for HRC fuse-links NH with striker

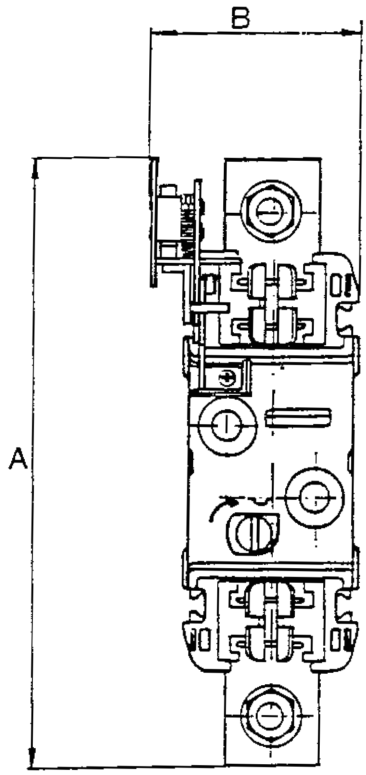


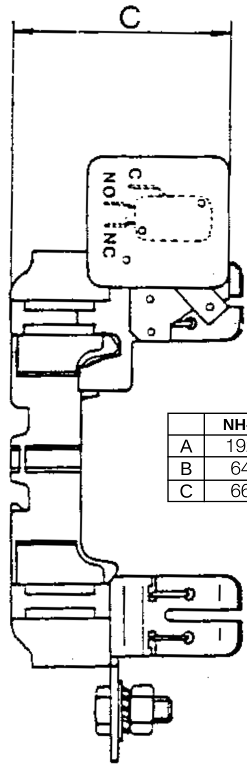
Q216697

- For fuse-links with striker
- Rail or screw fixing



Size	In (A)	Cat. Number	Ref. Number	Packing
0	160	42906	T216194	1
1	250	42908	Q216697	1
2	400	42910	D217215	1
3	630	42912	H218760	1

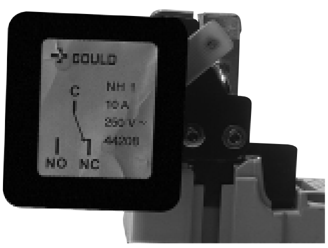




	NH-0	NH-1	NH-2	NH-3
A	192	213	222	233
B	64	93	73	80
C	66	77	82	83

Microswitch (sold separately)

- Microswitch for NH fuse bases in polyester material (screw or rail fixing).
- Microswitch operates when:
  - fuse melts
  - no fuse-link
- Operating voltage: 250 V~
- Rated current: 10 A.
- Terminal size: 6.3 x 0.8 mm.



Size	In (A)	Cat. Number	Ref. Number	Packing
0	160	44206	X219279	1
1	250	44208	Y219809	1
2	400	44210	J222487	1
3	630	44212	B223009	1

If you are interested in ordering microswitch and NH fuse base separately:

T218241 + X219279 same size as T216194 (size 0)

Blocks & Holders

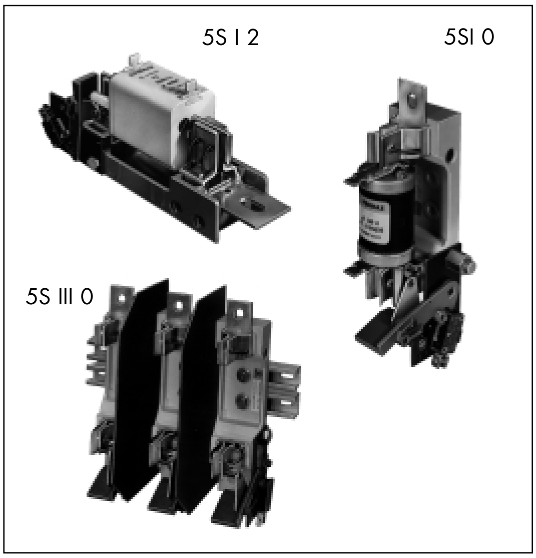
NH Fuses

Plastic Bases

5S - 00 to 4

FUSE HOLDERS
FOR BLADE-STYLE FUSES
SIZES: 00 - 0 - 1 - 2 - 3 - 4

- SHOCK-PROOF ASSEMBLY FOR HIGH THERMAL AND MECHANICAL WITHSTAND
- MOUNTING ON BASE WITH OR WITHOUT MICROSWITCH
- SELF-EXTINGUISHABLE FIBERGLASS POLYESTER BASE, SILVER-PLATED COPPER CLIPS WITH STAINLESS STEEL SPRINGS
- COMPLIANT WITH IEC 269.2.1 AND DIN 43620 STANDARDS



MAIN CHARACTERISTICS

Type and size	Voltage rating U_N (V)	Impulse withstand voltage Uimp (kV)	Fuse current rating I_N (A)	Maximum fuse operating current (A) gG	aM	URGB	690V gRB	690V URB	Recommended copper wire size (mm²)	Fire and fumes class NF F 16-101 and 102 and UL
5S I 00			160	160	160	130			70	x
5S I 0 5S II 0 5S III 0 5S IV 0			125 160 200 250 315 350 400	160	160		200 240 285 315	360	50 70 95 120 185 240	UL 94 VO I3-F3
5S I 1 5S II 1 5S III 1 5S IV 1			280 315 350 400 450 500 550 630	315	315		450 475 495 570		150 185 185 240 2x30x5 2x30x5 2x40x5 2x40x5	
5S I 2 5S II 2 5S III 2 5S IV 2	690		450 500 550 630 700 800 900	500	500		550 600 665	720 810	2x30x5 2x40x5 2x40x5 2x50x5 2x50x5 2x60x5	UL 94 VO I2-F1
5S I 3 5S II 3 5S III 3 5S IV 3			500 550 630 700 800 900 1000 1100 1250	630	630		800 855 950	990 1070	2x30x5 2x40x5 2x40x5 2x50x5 2x50x5 2x60x5 2x60x5 2x80x5	
5S I 4			1250	1250	1250				2x80x5	

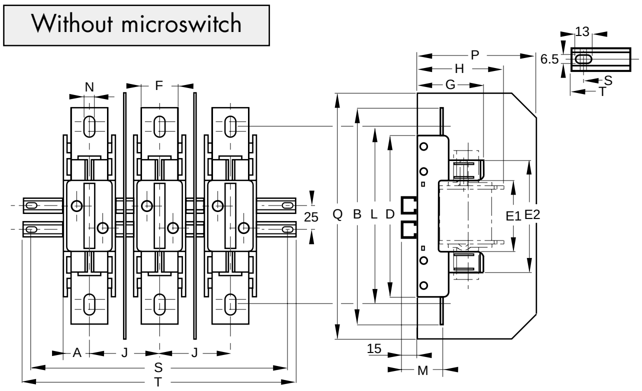
Ferraz Shawmut

Plastic Bases

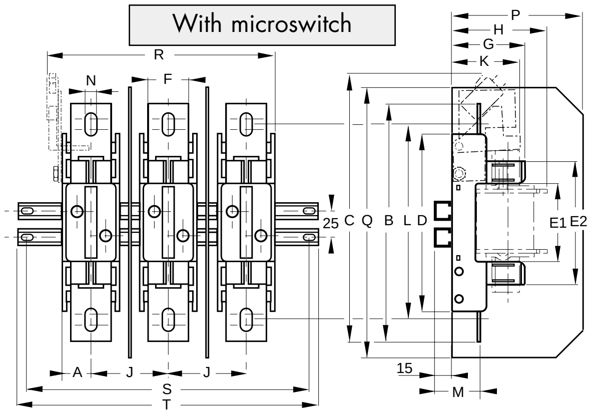
5S - 00 to 4

MULTIPOLAR FUSE-HOLDERS FOR BLADE-STYLE FUSES SIZES 0 -1 - 2 - 3

Without microswitch



With microswitch

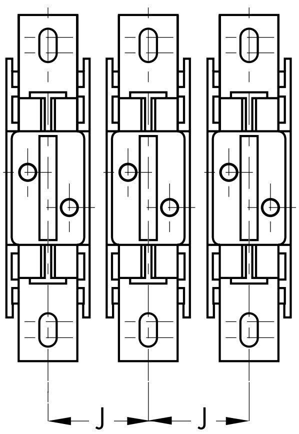


	Size	A	B	C	D	E_1	E_2	F	G	H	J	K	L	M	N	P	Q	R			S			T		
																		II	III	IV	II	III	IV	II	III	IV
Without microswitch (1)	0	23.5	177		133	77	121	25	64	87.5	47.5		150	40.5	8.5	95	190	94	142	192	126	179	222	147	200	243
	1	29.5	207		135	81.5	135.5	32	81.5	104.5	59.5		175	52	11	110	220	118	178	237	154	215	264	175	236	285
	2	29.5	244		181	83	134	40	83	108	67.5		200	42	11	120	270	118	178	237	154	222	287	175	243	308
	3	29.5	244		181	83	134	40	83	117	82.5		210	46.5	11	120	270	118	178	237	179	252	342	200	273	363
With microswitch	0	23.5	177	206	133	77	121	25	77	87.5	61.5	85	150	40.5	8.5	90	190	121.5	183	244.5	137	202	252	158	223	273
	1	29.5	207	220	181	81.5	135.5	32	81.5	104.5	73.5	85	175	52	11	110	220	145.5	219	292.5	165	242	308	186	263	329
	2	29.5	244	256	181	83	134	40	78	108	77.5	80	200	42	11	120	270	149.5	227	304.5	165	242	326	186	263	347
	3	29.5	244	256	181	83	134	40	83	117	85	80	210	46.5	11	120	270	157	242	327	179	264	342	200	285	363

(1) These products will be cancelled in 2001 (see plastic bases pages 469-472)

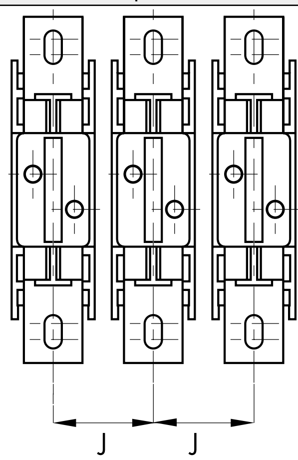
MULTIPOLAR CONFIGURATIONS WITH ONE-POLE FUSE-HOLDER ASSEMBLY

Without microswitch
Without partition



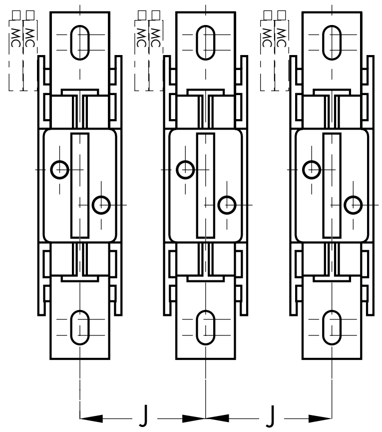
Size	J (mm)
00	40
0	50
1	62
2	70
3	85
4	120

Without microswitch
With partition



Size	J (mm)	Catalog Number	Reference Number
00	-	-	-
0	48	CI 0	M 091344
1	60	CI 1	N 091345
2	68	CI 2+Ent.	P 091346
3	83	CI 3+Ent.	Q 091347
4	-	-	-

With microswitch
Without partition

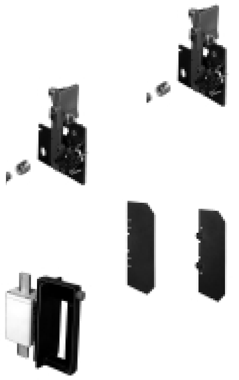


Size	J (mm)
00	-
0	61.5
1	73.5
2	73.5
3	85
4	120

Plastic Bases

5S - 00 to 4

ACCESSORIES



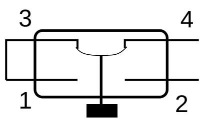
Accessory type	Size	Cat. Num.	Ref. Num.	Weight (g)	Packaging
simple microswitch	0 1 2 3	MC 2-5 T0-1 MC 2-5 T0-1 MC 2-5 T2-3 MC 2-5 T2-3	Q 091462 Q 091462 R 091463 R 091463	64 64 64 64	1 1 1 1
twin microswitch	0 1 2 3	MC 2-9 T0-1 MC 2-9 T0-1 MC 2-9 T2-3 MC 2-9 T2-3	S 091464 S 091464 T 091465 T 091465	70 70 73 73	1 1 1 1
isolating partition	0 1 2 3	CI 0 CI 1 CI 2+Ent. CI 3+Ent.	M 091344 N 091345 P 091346 Q 091347	37 110 83 83	2 2 2 2
pull-out handle	0 1 2 3	PMP	E 097708	160	1

MICROSWITCHES

Microswitches are designed to fit one-pole fuse-holders from size 0 to 4 enabling:

- blown-fuse indication
- fuse presence indication

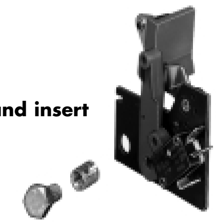
Remote-sensing microswitches are single- or twin-reversing models with electrical features 220 V - 10 A - cos φ = 0.3.
For size 0 to 3 fuse holders, microswitches delivered separately and side-mounted by means of an insert and special screw.
For size 4 fuse holders, microswitches factory assembled.
For multipolar fuse holders, a single microswitch is mounted for entire assembly.



With hand-reset style microswitch

#1 and 3 terminals must always be connected

Mounting of screw and insert



ISOLATING PARTITIONS

Isolating partitions fit fuse holders sizes 0 - 1 - 2 - 3. No partition is available for size 4.
Fitting of partitions:

- by direct snap-mounting for sizes 0 and 1 fuse holders
- by means of spacers for sizes 2 and 3

For multipolar assemblies, isolating partitions are mounted between each pole.



PULL-OUT HANDLE

For removing fuses, a pull-out handle snaps on the fuse lugs designed for this operation.



NH Fuses

Ceramic Bases

Sizes 00 to 4



CHARACTERISTICS

- Insulating base of ceramic material
- Silver-plated contacts with high-contact pressure springs
- For size 4, pressure is assured by a special nut.

Size 1 fuse bases accept fuse sizes 0 and 1.
Size 2 fuse bases accept fuses size 1 and 2.
Size 3 fuse bases accept fuses size 1, 2 and 3.
Type EP fuse bases with square contacts.
Type PP fuse bases with clip contacts.
Fuse bases size 0, 1, 2, 3 must be used with reinforced symmetrical rail, ref. 45550.

690V CERAMIC fuse bases for NH fuse-LINKS

- Ceramic insulating bases
- Silver plated contacts
- High spring contact pressure
- Screw mounting
- Standards : DIN43620, IEC269-2-1, NFC63210, 63211, 60200, VDE DIN0636



Y214151

Single-Pole Fuse Bases

SIZE	RATED CURRENT (A)	CATALOG NUMBER	REFERENCE NUMBER	STANDARD PACK
00-E	160	40002	Z217211	12
00-EB	160	40003	E217722	12
0-E	160	40004	P218237	4
0-P	160	40006	C218755	4
1-P	250	40008	R219274	3
2-P	400	40010	S219804	3
3-P	630	40012	D222482	3
4-P	1250	40014	W223004	1



Z217211

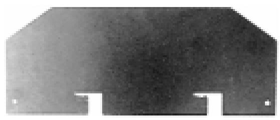


C218755

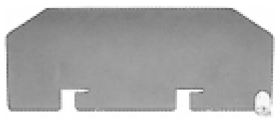
Three-Pole Fuse Bases

SIZE	RATED CURRENT (A)	CATALOG NUMBER	REFERENCE NUMBER	STANDARD PACK
00-E	160	40502	D201851	3
00-EB	160	40503	A211071	3
0-E	160	40504	Q211591	1
0-P	160	40506	Z212105	1
1-P	250	40508	T213641	1
2-P	400	40510	Y214151	1
3-P	630	40512	B214660	1

Notes: Size 1 fuse base will accept size 0 fuses.
Size 2 fuse base will accept size 1 fuses.
Size 3 fuse base will accept size 1 & 2 fuses.
Size 4 has a special nut to assure contact pressure.
Types E and EP have square contacts
Types P and PP have pincer contacts
Type EB has pressure-plate cable connection.



FRICTION FIT
K211103



TAB FASTENED
S215710

Insulating Barriers for Ceramic NH Fuse Bases

	SIZE	RATED CURRENT (A)	CATALOG NUMBER	REFERENCE NUMBER	STANDARD PACK
FRICTION FIT K211103	00	100	45102	A201365	10
	0	160	45104	M201882	10
	1-2	400	45110	K211103	4
	3	630	45112	Z211622	2
TAB FASTENED S215710	00	100	45202	G214182	10
	0	160	45204	L214692	10
	1-2	400	45210	Q215202	4
	3	630	45212	S215710	2
	4	1250	45214	Y216221	2

Blocks & Holders

NH Fuses

Plastic Bases

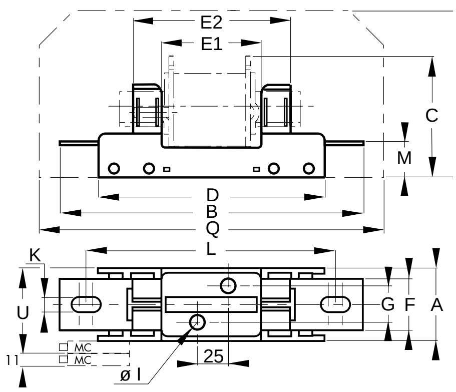
5S - 00 to 4

Size and number of poles		Fuse holders without indication(1) Catalog Number	Reference Number	Weight (g)	Fuse holders with indication Catalog Number	Reference Number	Weight (g)	Packaging
00	1			100				3
0	1	5S I 00	F 091706	210				3
	2	5S I 0	G 091339	630	*		720	1
	3	5S II 0	Z 091378	875	5S II 0 MCN	H 091363	975	1
	4	5S III 0	R 091348	1120	5S III 0 MCN	N 091368	1230	1
1	1	5S IV 0	X 091353	570	5S IV 0 MCN	T 091373		3
	2	5S I 1	H 091340	1280	*		1370	1
	3	5S II 1	A 091379	1900	5S II 1 MCN	J 091364	2000	1
	4	5S III 1	S 091349	2520	5S III 1 MCN	P 091369	2630	1
2	1	5S IV 1	Y 091354	660	5S IV 1 MCN	V 091374		3
	2	5S I 2	J 091341	2080	*		2170	1
	3	5S II 2	B 091380	2800	5S II 2 MCN	K 091365	2900	1
	4	5S III 2	T 091350	3520	5S III 2 MCN	Q 091370	3630	1
3	1	5S IV 2	Z 091355	895	5S IV 2 MCN	W 091375		3
	2	5S I 3	K 091342	2940	*		3030	1
	3	5S II 3	C 091381	4070	5S II 3 MCN	L 091366	4170	1
	4	5S III 3	V 091351	5200	5S III 3 MCN	R 091371	5310	1
4	1	5S IV 3 5S I 4	A 091356 L 091343	2500	5S IV 3 MCN 5S I 4+MC 2-5 T 4	X 091376 G 091362	2590	3

* Models supplied in kit form: fuse holder + microswitch

(1) These products will be cancelled in 2001 (see plastic bases pages 469-472)

ONE-POLE FUSE HOLDERS FOR BLADE-STYLE FUSES SIZES 00 - 0 -1 - 2 - 3

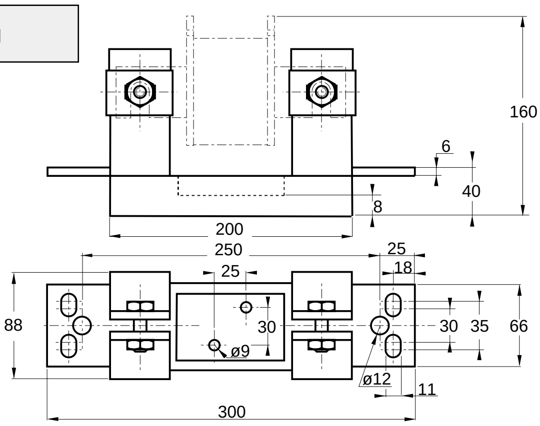


Elastic clamping

	A	B	C	D	E1	E2	F	G	ø1	J1	J2	J3	K	L	M	P	Q	U
00	38	128	82	85	58	–	20	0	7.5	40	–	–	9	105	25.5	–	–	–
0	48	177	87.5	133	77	121	25	0	7	50	48	61.5	8.5	150	25.5	95	190	64
1	58.5	207	105	135	81.5	135.5	32	30	9	62	60	73.5	11	175	37	110	220	76
2	58.5	244	108	181	83	134	40	30	9	70	68	73.5	11	200	27	120	270	76
3	58.5	244	117	181	83	134	40	30	9	85	63	85	11	210	31.5	120	270	76

ONE-POLE FUSE-HOLDERS FOR BLADE STYLE FUSES, SIZE 4

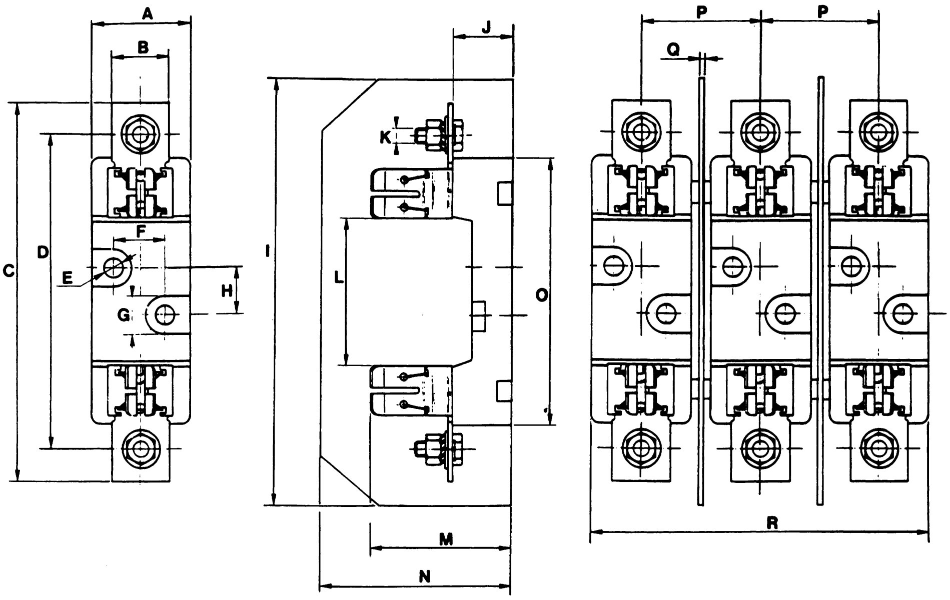
Forced clamping



NH Fuses

Ceramic Bases

Sizes 00 to 4



Dimensions of Ceramic Fuse Bases for NH Fuse-links

	00-E, EB	0-E	0-P	1-P	2-P	3-P	4-P
A	33	32	32	55	55	55	80
B	20	20	25	32	35	40	45
C	118.5	269	166	210	227	241	312
D	100	151	150	175	200	210	262
E	8	8.5	8.5	11	11	11	11
F	-	-	-	30	30	30	45
G	14.5	14	14	22	22	22	-
H	25	25	25	25	25	25	30
I	145	185	185	250	250	250	-
J	21.5	29	29	35	35	35	45
K	8	8	8	10	10	12	16
L	55	72	74	84	84	84	111
M	52.5	60	60	71	89	103	145
N	80	85	85	100	100	127	-
O	84	120	120	148	148	148	192
P	34	47	47	62	69	82	-
Q	1	2	2	2	2	2	-
R	101	126	126	177	190	213	-

Special Fuse Bases



LV HRC (NH)
Ceramic fuse bases
~ 690 V/-440 V,
Triple pole

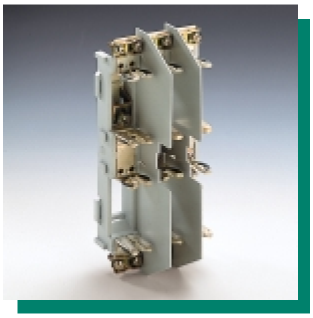
Screw fastening

Size	Rating A	Connec. Cable Section mm²	Description	Catalog Number	Reference Number	Packing
1	250	150	screw	08141.000000	H201717	1
2	400	300	screw	08142.000000	D211971	1



LV HRC
Fuse base in load-breaking design
~ 690 V/-440 V,
Single pole
Rated switching capacity
8 x I_N, for LV HRC
Fuse-links size 4 a

Size	Rating A	Connec. Cable Section mm²	Description	Catalog Number	Reference Number	Packing
4 a	1250		screw	08124.000000	E222161	1



LV HRC (NH)
Busbar fuse-base,
~ 690 V/-440 V, triple pole
with 6 outputs;
Input contacts each connected in parallel to one infeed, providing six fuse-protected outputs.

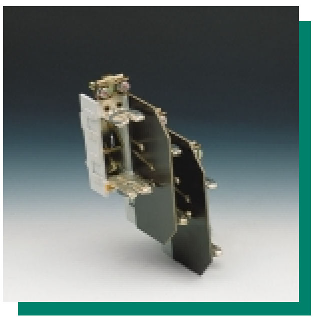
Size	Rating A	Connec. Cable Section mm²	Description	Catalog Number	Reference Number	Packing
00	160	Cu 70. Al 95	Clamp	08094.200000	Z201203	2



LV HRC (NH)
Busbar fuse-base,
~ 690 V/-440 V,
Single pole

Size	Rating A	Connec. Cable Section mm²	Description	Catalog Number	Reference Number	Packing
00	160	Cu 70. Al 95	Clamp	08091.200300	A213555	3

Including one partition wall



Triple pole,
produced by connecting three single pole bases: consecutively at one level or stepped for 40 mm busbar systems

Size	Rating A	Connec. Cable Section mm²	Description	Catalog Number	Reference Number	Packing
00	160		Clamp	3 x 08091.200300	3 x A213555	

Fuse Base Accessories



Clamp covers
for busbar fuse-base
8091.2003

Size	Rating A			Catalog Number	Reference Number	Packing
for input side						
00	160			08091.900300	F218666	20
for output side						
00	160			48130.000000	Y219717	20



LV HRC (NH)
Repair fuse-base
~ 690 V/-440 V,
Mountable on normal fuse-bases

Size	Rating A			Catalog Number	Reference Number	Packing
00	100	long contact		08018.000000	T212537	3
00	100	short contact		08019.000000	E213053	3



LV HRC
Disconnecting
knife with voltage-free
handle tags
for LV HRC bases as per
DIN 43620 part 3

without voltage-free
handle tags

Size	Rating A		Description	Catalog Number	Reference Number	Packing
00	160		voltage-free	08009.000080	W216058	10
0	160		voltage-free	08010.000080	J217082	5
1	250		voltage-free	08011.000080	Y218107	5
2	400		voltage-free	08012.000080	E200656	5
3	630		voltage-free	08013.000080	J201718	5
00	160		spannungsführend	08009.000000	Y211506	15
0	250		spannungsführend	08010.000000	D212017	3
1	250		spannungsführend	08011.000000	V212538	9
2	400		spannungsführend	08012.000000	B213556	6
3	630		spannungsführend	08013.000000	B213556	6
4	1250		zum Anschrauben	08014.000000	E211972	3
4 a	1250		for disconnec.model	08015.000000	A214061	1



LV HRC fuse link pull handle
with hand protections as per
DIN 43620 part 4 and
VDE 0680 part 4

Size	Rating A		Description	Catalog Number	Reference Number	Packing
00 bis 4			without arm cuff	08022.000000	P215592	1
00 bis 4			with arm cuff	08024.000000	X216105	1

LV HRC arm cuff total length
350 mm, with cover and snap
button fastener, suitable for
subsequent mounting.

Size	Rating A		Description	Catalog Number	Reference Number	Packing
			for commercial-size LV HRC fuse link pulling handle	08029.000000	T218149	1



LV HRC (NH) barriers
for use in fuse-bases
as per DIN 43620 part 4

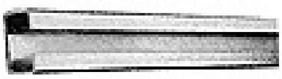
Size	Rating A		Description	Catalog Number	Reference Number	Packing
00				08016.000000	H214574	5
1/2/3				08017.000000	P215086	3

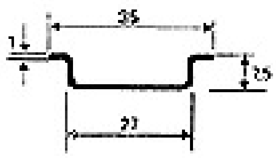


Protective helmet
as per DIN 4840
with interior supporting
head band and webbing,
without protective shield

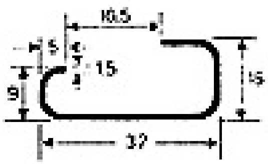
Description	Catalog Number	Reference Number	Packing
For electricians	08025.000000	T216608	1
Accessory: protective shield	08027.000000	F217125	1

Mounting Rail

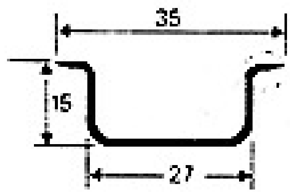
	Description	Catalog Number	Reference Number
	Symmetrical	45510	J213172
	Symmetrical drilled	45520	C213672
	Asymmetrical	45530	H214183
	Asymmetrical drilled	45540	M214693
	Symmetrical reinforced	45550	R215203
	Squared 20x10	45560	Z216222
	Squared drilled 20x10	45570	Y216727
	Squared 40x20	45580	L217245
	Squared drilled 40x20	45590	R217756



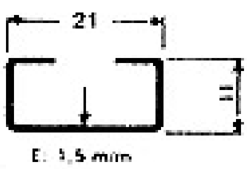
C213672



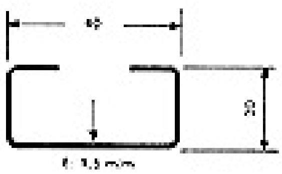
M214693



R215203



Y216727


R217756

Approvals: DIN 46277/1, DIN 46277/3, EN 50022, EN 50035

LH HRC Fuse Switch-Disconnector



Specifications

DIN VDE 0660 Part 107
IEC 60947-3 (IEC 408)
EN 60947-3

General description

NH fuse switch units by Lindner are the result of consistent, continuous development in the safe handling of the NH fuse system. Essential disadvantages of this system, such as the lack of shock-hazard protection and the hazardous operation of “withdrawing under load”, are exceptionally well countered by Lindner fuse switch units.

NH fuse switch units by Lindner are produced in three-pole configurations in sizes C00 to 4a, i.e. in the rated current range of 160 A to 1250 A, matching the standardized series of the NH fuse system to DIN VDE 0636, with dimensions to DIN 43620, for a maximum rated current of 690 VAC.

Our range includes the following models, tailored to suit different user needs:

- “GI” series: Offering the user a particularly good choice when it comes to ergonomics. The various preassembled versions available within the range cater to problems of different kinds, offering a choice of installation material with or without DIN rails and/or busbar adapters and including different frames where necessary. As a result, this series is particularly well suited to the user who intends to put standard systems effectively into practice.
- “BS” series: The most up-to-date series, unmistakeable in its modern, consistently employed external design, incorporates years of experience in the manufacture of fused switching devices. The series’ most important feature apart from the well-conceived design of its NH fuse switch units is a comprehensive range of accessories. As well as a variety of different busbar adapters for all commonly used busbar systems, the range includes kits for DIN-rail mounting, a wide choice of frames, terminals for different terminal-connection techniques or conductors (aluminum cables, for instance) and remote-diagnostic facilities (based on switch-lid position and/or a fuse-monitoring circuit).

Fuse Switch-disconnectors



LV HRC fuse switch-disconnector
3-pole, ~ 690 V AC
for fuse-links to DIN 43620,
fully insulated,
in high temperature resistant
thermoplastic, with quenching
plates (hard-gas principle)

Size	Rated current in A		Type of terminal	Catalog Number	Reference Number	Packing
00	160		Screw M8	08295.000405	S222932	1
00	160		Screws 2 x M5	08295.200405	A201779	1
1	250		Screw M10	08291.000405	W212033	1
2	400		Screw M10	08292.000000	Y213070	1
3	630		Screw M12	08293.000000	T214078	1
4A	1250		Screw	08314.000000	H215609	1
00	Screw with MPS			08295.080405	Q201264	1
00	Clamp with MPS			08295.280405	Q211522	1

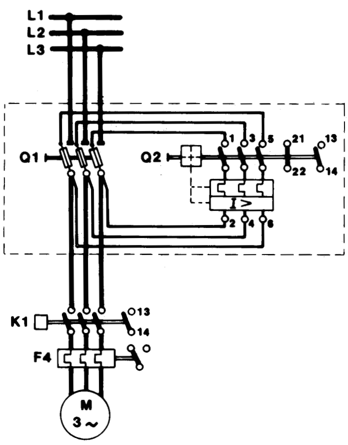


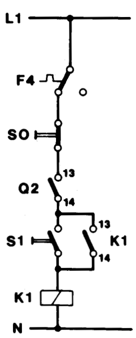
LV HRC fuse switch-disconnector
with fuse monitoring by motor
protection switch

N.B.: motor protection
switch for fuse monitoring can
only be used in connection with
fuse-links with live grip-lugs.

Technical data for motor protection switch:

Contacts:	1 make/1break
Number of cables:	break: 1 and 4 (contact number 21, 22)
	make: 2 und 3 (contact number 13, 14)
Height:	approx. 100 mm
Maximum rated current :	5 A at 250 V
	1.2 A at 500 V
Rated conditional fused Short circuit current	100 kA





Example: circuit diagram with motor protection switch

Ferraz Shawmut

Fuse switch-disconnectors



Trim frame
"small" size, for LV HRC
fuse switch-disconnector
size 00

Size	Design	Catalog Number	Reference Number	Packing
00	199 x 124 mm	08295.001405	C200723	1
00	398 x 124 mm	08295.002405	B201780	1
1	248 x 348 x 8 mm	08291.001405	Q216122	1
2	248 x 348 x 8 mm	08292.001405	Z213071	1
3	248 x 348 x 8 mm	08293.001405	R219734	1



Trim frame
"Hood" for LV HRC fuse
switch-disconnector size 00
when used in busbar systems
or when base mounting, to
cover terminal compartments.

Size	Design	Catalog Number	Reference Number	Packing
00	200 x 114 x 40 mm	08295.008405	X212034	1



Busbar adapter for
fuse switch-disconnector
size 00

Size		Design	Catalog Number	Reference Number	Packing
00	40	claw terminals	08295.840405*	V213573*	1
00	60	claw terminals	08295.860405*	V214079*	1
00	100	drilled-hole fixing for M8 screws	08295.890405*	C214592*	1

* Infeed from above by turning the claw terminals.



Adapter for busbar systems
with busbar center spacing
of 60 mm
Direct fastening with claw-type
terminals

Size	Design	Catalog Number	Reference Number	Packing
1	For bars 12x5 - 30x10 mm	08291.860405	Z218683	2
2	For bars 12x5 - 30x10 mm	08292.860405	A218684	1



Adapter for busbar systems
with busbar centre spacing
of 100 mm
Screw fastening

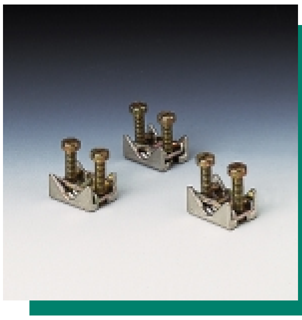
Size	Design	Catalog Number	Reference Number	Packing
1	Hole diameter Ø 11 mm	08291.890405	M219201	1
2	Hole diameter Ø 12 mm	08292.890405	N219202	1
3	Hole diameter Ø 13 mm	08293.890405	Z222179	1

Fuse switch-disconnectors



Fixing set
for top-hat-rail assembly for
DIN busbars to
DIN EN 50022: 35 x 7,5 mm.
Busbar spacings adjustable
to 125 mm or 150 mm.

Size	Busbar center spacing in mm	Catalog Number	Reference Number	Packing
00	125/150 mm	08295.500405	A213072	1



Clamp set for aluminum cable,
size 00
1 set = 3 pcs. clamps
cable dimensions:
1.5 - 70 mm² rm

Size	Design	Catalog Number	Reference Number	Packing
00	clamp set for alu	08295.007405	R211523	1



Clamp set for aluminium cable,
size 1
1 set = 3 pcs. clamps

Size	Design	Catalog Number	Reference Number	Packing
1/2	clamp set for alu	08384.000005	T219736	1



Monitoring system
for cover-position monitoring,
microswitch
1 make contact/
1 break contact

Size	Design	Catalog Number	Reference Number	Packing
00	microswitch	08295.030405	P212556	1

Technical data

Rated thermal current	5 A
Rated operational current I_e/AC 14 at 230V, 50/60 Hz	0,25 A
maximum operational voltage	250 V

Fuse switch-disconnectors



Clamp set
1 set = 3 pcs. clamps

Size		Catalog Number	Reference Number	Packing
1 2/3		08272.000000 08273.000000	X214541 A215050	1 1

Reference to:



TRI 60
LV HRC fuse switch-disconnector
for direct mounting on busbars with
60 mm center spacing

Size	Rated current in A	Type of terminal	Catalog Number	Reference Number	Packing
00	160	Screw Clamp	08363.000000 08363.200000	P215109 Q215616	1 1

Fuse switch-disconnectors



LV HRC fuse switch-disconnector
Triple pole, 690 V AC
Made of material resistant to creeping current, equipped with contact protection and arc quenching chambers

Adapter
for busbars 12 x 5 – 12 x 10

Size	Rated current in A	Type of terminal	Catalog Number	Reference Number	Packing
Screw mounting					
00	160	Screw	08295.000000	J219152	1
00	160	Clamp	08295.200000	K212506	1
1	250	Screw	08291.000000	W200671	1
1	250	Clamp	08291.200000	L211472	1
Screw mounting, with trim frame					
00	160	Screw	08295.010000	D206474	1
00	160	Clamp	08295.210000	R214030	1
1	250	Screw	08291.010000	L201214	1
00	160	40 mm	08295.800000	Q219687	1



As above, but with snap fixing for mounting on two bars, as per DIN VDE 50022, adjustable distance between bars

Size	Rated current in A	Type of terminal	Catalog Number	Reference Number	Packing
Quick mounting, without trim frame					
1	250	Screw	08291.050000	S206487	1
1	250	Clamp	08291.250000	L212507	1
Quick mounting, with trim frame					
00	160	Screw	08295.070000	K211471	1
00	160	Clamp	08295.270000	D215559	1
1	250	Clamp	08291.270000	T213020	1



LV HRC fuse switch-disconnector
Size 00, triple pole,
160 A, 690 V AC
With bus bar adapter

Size	Rated current in A	Busbar center spacing in mm	Catalog Number	Reference Number	Packing
Quick mounting screw terminal					
00	160	40	08295.005000	P219686	1
top clamp terminal					
00	160	40	08295.305000	L216072	1

Quick mounting due to simple positioning and toggle locking mechanism on busbar systems (DIN 43870, 12 mm wide, 40 mm distance)



Trim frame
for series “GI“

2-fold

3-fold

Size	Rated current in A		Catalog Number	Reference Number	Packing
128 x 190 x 1,5 mm					
00	160		08295.001000	K219153	25
230 x 295 x1,5 mm					
1	250		08291.001000	N216580	1
240 x 190 x 1,5 mm					
00	160		08295.002000	R201265	10
348 x 190 x 1,5 mm					
00	160		08295.003000	Y207320	10

Accessories
for LV HRC Fuse Switch-Disconnector
Series “GI”

Size	Rated current in A		Catalog Number	Reference Number	Packing
00			08295.900000	X222131	1
1			08291.900000	W217093	1

NH Fuses

Fuse switch-disconnectors

"BS" Series

	00	1	2	3
Poles	3-pole	3-pole	3-pole	3-pole
Continuous current rating	160 A	250 A	400 A	630 A
Rated operational voltage U_e	~ 690 V	~ 690 V	~ 690 V	~ 690 V
Nominal frequency	45 – 62 Hz	45 – 62 Hz	45 – 62 Hz	45 – 62 Hz
Nominal insulation voltage U_i	1000 V	1000 V	1000 V	1000 V
Insulation group to VDE 0110	C	C	C	C
Rated breaking capacity				
AC 23 B / ~ 400 V cos φ = 0,35	128 A	200 A	320 A	500 A
AC 22 B / ~ 500 V cos φ = 0,65	160 A	250 A	400 A	630 A
AC 21 B / ~ 660 V cos φ = 0,95	80 A	125 A	200 A	315 A
Rated short-time current I_{cm}	3 KA	10 kA	20 kA	20 kA
Rated making capacity with fuse links	50 kA	50 kA	50 kA	50 kA
Max. power loss of fuse links	12 W	23 W	34 W	48 W
Standard screw connection	M8/15 Nm	M10/38 Nm	M10/38 Nm	M12/48 Nm
For cable lugs	4 – 70 mm²	6 – 150 mm²	120 – 300 mm²	120–300mm²
For copper ribbon cable, flexible	9 x 6 mm	15 x 9 mm	24 x 15 mm	24 x 15 mm
For busbars in width	20 mm	30 mm	40 mm	50 mm
Weight	0.6 kg	1.5 kg	1.9 kg	2.6 kg
Degree of protection	IP 20	IP 20	IP 20	IP 20

Pertaining to use of semiconductor fuse-links with max. power-losses defined in table.

Blocks & Holders

NH Fuses

Fuse switch-disconnectors

"GI" Series

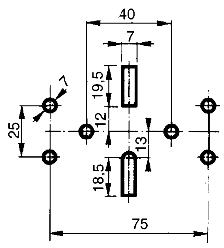
	00	1	2	3
Poles	3-pole	3-pole	3-pole	3-pole
Continuous current rating	160 A	250 A	400 A	630 A
Rated operational voltage U_e	~ 690 V	~ 690 V	~ 690 V	~ 690 V
Nominal frequency	45 – 62 Hz	45 – 62 Hz	45 – 62 Hz	45 – 62 Hz
Nominal insulation voltage U_i	2000 V	2000 V	2000 V	2000 V
Insulation group to VDE 0110	C	C	C	C
AC 23 B / ~ 400 V cos φ = 0,35	128 A	200 A	320 A	500 A
AC 22 B / ~ 500 V cos φ = 0,65	160 A	250 A	400 A	630 A
AC 21 B / ~ 690 V cos φ = 0,95	80 A	125 A	200 A	315 A
Rated short circuit current I_{cm}	3 kA	10 kA	20 kA	20 kA
Rated making capacity with fuse links	25 kA	35 kA	50 kA	50 kA
Max. power loss of fuse links	12 W	23 W	34 W	48 W
Standard screw connection	M8/15 Nm	M10/38 Nm	M10/38 Nm	M12/48 Nm
For cable lugs	4 – 70 mm²	6 – 150 mm²	120 – 300 mm²	120 – 300 mm²
For copper ribbon cable, flexible	9 x 6 mm	15 x 9 mm	24 x 15 mm	24 x 15 mm
For busbars in width	20 mm	30 mm	40 mm	50 mm
Degree of protection	IP 20	IP 20	IP 20	IP 20

Pertaining to use of semiconductor fuse-links with max. power-losses defined in table.

Fuse switch-disconnectors

Fixing dimension for base mounting

Size 00

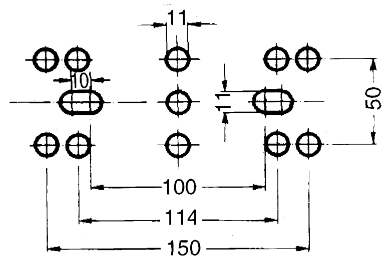


Connection mid-point
Fixing mid-point

Thickness of switch base: 7 mm
Fixing screws: M10

Size 1

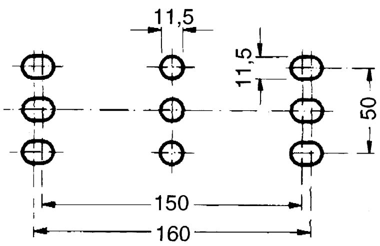
Connection mid-point
Fixing mid-point



Thickness of switch base: 4 mm
Fixing screws: M10

Size 2

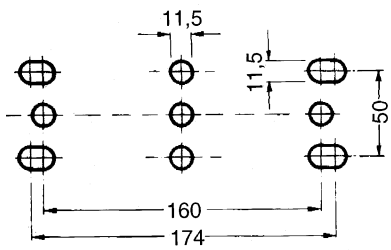
Connection mid-point
Fixing mid-point



Thickness of switch base: 3 mm
Fixing screws: M6

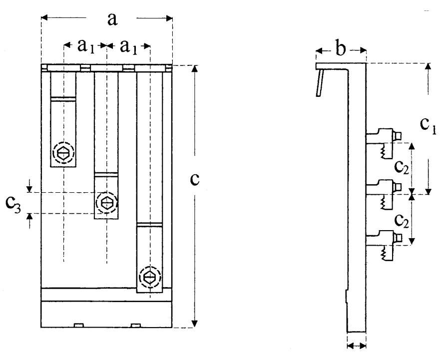
Size 3

Connection mid-point
Fixing mid-point



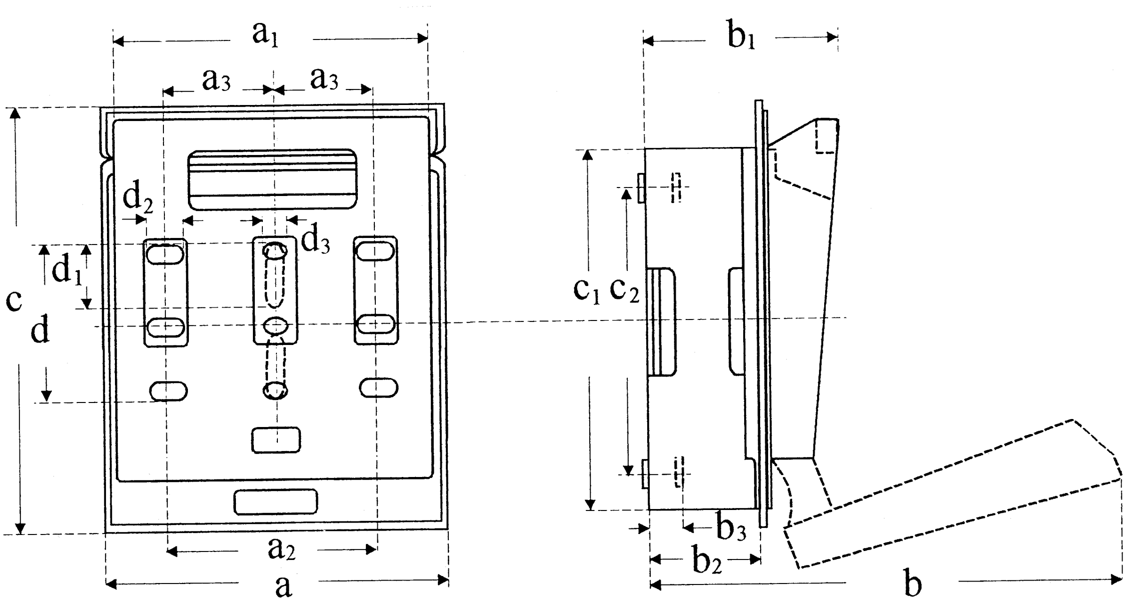
Thickness of switch base: 7 mm
Fixing screws: M10

Adapter for busbar system



Catalog Number	Reference Number	a	a1	b	b1	c	c1	c2	c3
08295.840405	V213573	108	33	40	20	170	80	40	–
08295.860405	V214079	108	33	40	20	170	80	60	–
08295.890405	C214592	98	33	28	28	220	65	100	9
08291.860405	Z218683	175	60	46	13	210	105	60	–
08291.890405	M219201	160	60	44	13	245	120	100	11
08292.860405	A218684	190	65	50	16	210	130	60	–
08292.890405	N219202	180	65	50	16	260	145	100	12
08293.890405	Z222179	230	80	50	18	260	150	100	13

Fuse switch-disconnectors



"BS" Series

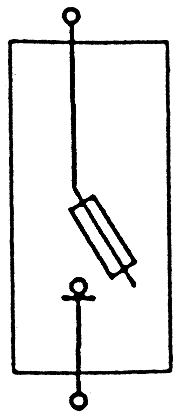
	a	a1	a2	a3	b	b1	b2	b3	c	c1	c2	d	d1	d2	d3
08295.xx0405 Gr. 00	108	106	75	33	200	80	49	15,5	190	150	110	25	19	7	7
08291.x00405 Gr. 1	198	188	114	60	250	111	62	27	260	226	190	50	–	14	11
8292. Gr. 2	206	200	150	65	352	135	80	285	305	270	214	50	–	15	11,5
8293. Gr. 3	256	246	160	80	263	146	91	27	308	270	213	50	–	15	11,5
8314 Gr. 4a	324	–	–	–	–	495	152	–	350	350	–	30	–	14	–

"GI" Series

	a	a1	a2	a3	b	b1	b2	b3	c	c1	c2	d	d1	d2	d3
8295.xx Gr. 00	108	–	66	33	193	79	43,5	30	170	132	109	25	–	6,5	6,5
8291.xx Gr. 1	184	–	114	57	288	105	55	35	267	185	183	50	–	11	11

Dimension in mm

As per IEC 60947-3:



Fuse switch-disconnectors — LINOCUR

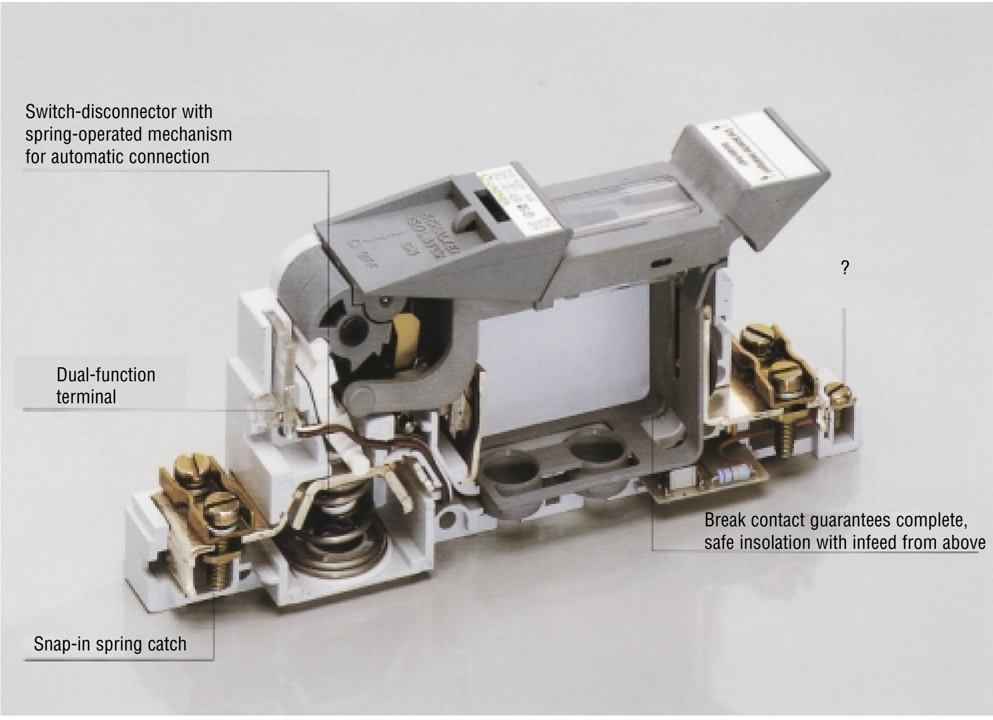
Linocur Switch-Disconnector for NH00 Fuse

125 , ~290/500 V, 1 - 3pole
100 A ~400/690 V, 1 - 3pole

Standard specifications: DIN VDE 0660 Part 107
EN 60947-3
IEC 60947-3
VBG 4

Approval symbols:		
ÖVE	ÖVE, Austria	British Lloyd's Register of Shipping
S	SEV, Switzerland	German Lloyd
FI	Finnland	KEMA KEUR Netherlands

NH00-LINOCUR
A New Generation of New Technology



Fuse switch-disconnectors LINOCUR

NH00 LINOCUR

NH00 LINOCUR is a switch-disconnector for NH00 fuses to a maximum of 125 A. Adapted for the NH system, the Linocur concept is based on proven technology for disconnecting then changing the fuse-link in its voltage-free state.

NH00 LINOCUR provides the optimum complement in the nominal current range up to 125 A to the renowned D0 LINOCUR switch-disconnector for NEOZED fuse-links up to 63 A.

Basic design:

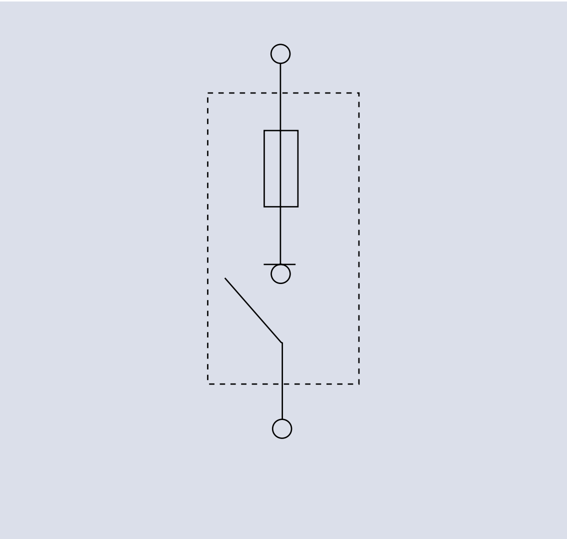
NH00 LINOCUR combines a switch-disconnector as per DIN 0660 part 107 (IEC 60947-3) and an NH fuse-base in one enclosure. It has a load-switching capacity and its disconnector function complies to IEC 60947-3. The unit design enables clearing, connecting and disconnecting of electric equipment without removing fuse-links.

NH00 LINOCUR has two activating elements:

- Switching lever activates the disconnector for switching electrical appliances under load

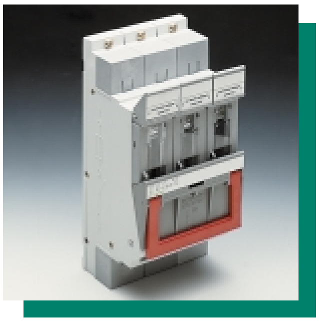
- Swivel unit serves to reception and pulling of NH fuse-link

As per IEC 60947-3



Fuse switch-disconnectors LINOCUR

NH00 LINOCUR Switch-disconnector



NH00 LINOCUR
switch-disconnector
for NH fuse-links

Rated Current Voltage		Catalog Number	Reference Number	Packing
125A ~ 290V/ 100A ~ 400V	1 Terminal block	08601.000000	N216626	1
125A ~ 290V/ 100A ~ 400V	1 Terminal block/ 3 x 10 mm²	08601.220000	N222882	1
125A ~ 500V/ 100A ~ 690V	2 Terminal block	08602.000000	B218685	1
125A ~ 500V/ 100A ~ 690V	2 Terminal block/ 3 x 10 mm²	08602.220000	C201781	1
125A ~ 500V/ 100A ~ 690V	3 Terminal block	08603.000000	Y212035	1
125A ~ 500V/ 100A ~ 690V	3 Terminal block/ 3 x 10 mm²	08603.220000	W213574	1

NH00 LINOCUR
For DC 2-pole with fuse monitoring

Rated Current Voltage		Catalog Number	Reference Number	Packing
125A – 130V	2 Terminal block	08602.000200	S219735	1
125A – 130V	2 Terminal block 3 x 10 mm²	08602.220200	M201215	1

Fuse switch-disconnectors LINOCUR

Switch-disconnector for NH00 Fuse



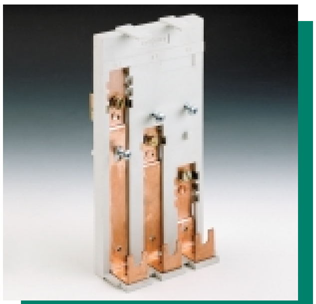
"Work-in-progress" Lock-out block for insertion under switch handle, can be locked with padlock.

	Catalog Number	Reference Number	Packing
For all designs			



Masking frame trim for flush mounting NH00 LINOCUR

	Catalog Number	Reference Number	Packing
3-pole NH00-LINOCUR	08603.110000	C218686	10
2 x 3-pole NH00-LINOCUR	08603.120000	Q219204	10
3-pole NH00-LINOCUR locked with padlock	08603.130000	W222935	10



Adapter for NH00 LINOCUR 3 x 8601, 3 x 8601.22, 1 x 8603, 1 x 8603.22

		Catalog Number	Reference Number	Packing
40 mm System	20 x 10	08600.400000	D214593	1
50 mm System	30 x 10	08600.500000	P216627	1
60 mm System	30 x 10	08600.600000	F217654	1

Fuse switch-disconnectors LINOCUR

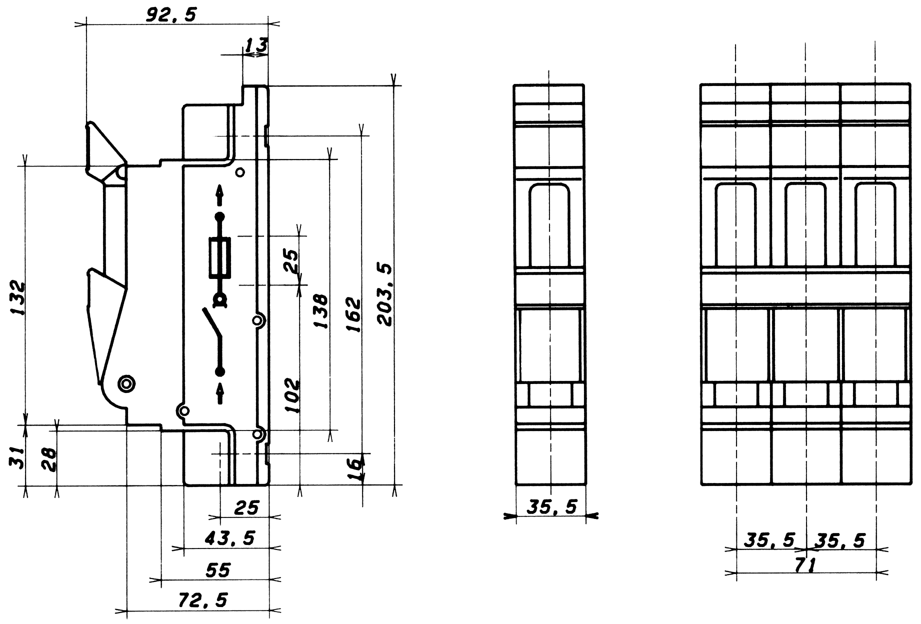
NH00-LINOCUR Switch-disconnector for NH00 Fuse

Switch-disconnector for NH00 fuses	125 A	100 A	125 A	100 A
	1-pole	multiple poles		
	~ 290 V	~ 400 V	~ 500 V	~ 690 V

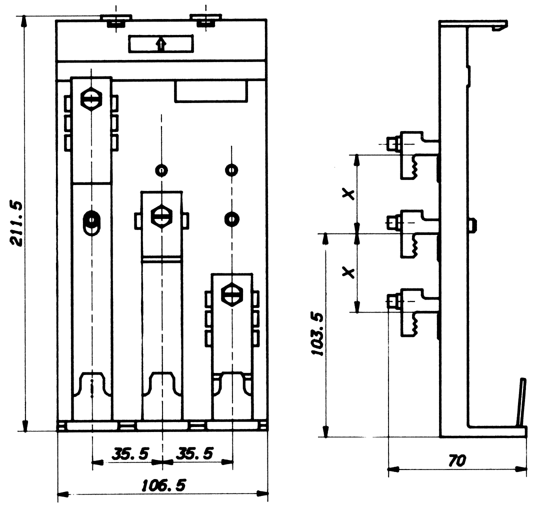
Main characteristics	
Approvals and Standards	
DN -VDE 0660 Part 107	100 A/~ 690 V AC 22
	125 A/~ 500 V AC 22
German Lloyd	125 A/~ 500 V AC 22
British Lloyd's Register of Shipping	125 A/~ 500 V AC 22
ÖVE SN 40	125 A/~ 500 V AC 22
NH Fuse applications	NH00 to 125 A gl/gG
Materials	RAL 7035, self-extinguishing, halogen-free
Terminal types input/output	Screw/Screw M 8
	Clamp/clamp
	Clamp/Terminal block 3 x 10 m^2
Max. cable sizes	up 70 mm^2
Protection against unwanted switching	Lock out Block Catalog Number 3860
Ambient temperature	- 5 °C to 40 °C
Electrical Data	
as paer DIN-VDE 0660 Part 107	
Utilisation category	AC 22
Current type	3 In
Betätigungszyklen	25
Electrical endurance	
Utilisation category	AC 22
Current type	In
cos φ	0,65
Cycles	150
Mechanical endurance	
Cycles	3000
Nominal insulation tension	~ 1000 V
Rated short-circuit current	50 kA
Direct current behavior	
Utilisation category	DC 22
Current type	125 A
Max. operating voltage	– 65 V
	3 poles in series = –195 V
Cycles	5
Fuse monitoring	Electronic fuse-monitoring circuit indicates fuse failure by flashing
Minimum operating voltage required for operation of electronic fuse monitoring circuit	100 V

Fuse switch-disconnectors LINOCUR

NH00-LINOCUR Switch-disconnector for NH00 Fuse



Adapter for NH00 LINOCUR



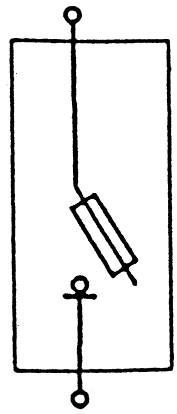
Max. Torque 5 Nm (Fastening by busbar systems)

Fuse switch-disconnectors MULTIVERT

MULTIVERT
NH Fuse switch-disconnector
vertically mounted for busbars

Specifications

DIN VDE 0660 Part 107
EN 60 947-3
IEC 60947-3 (IEC 408)
DIN 43 623



General description

MULTIVERT NH fuse switch-disconnectors by Lindner offer the user optimum safety and solutions to problems. They are the product of continued development in fuse switch-disconnectors for busbars. Their user-friendly compact design and ease of operation, combined with high switching performance, makes MULTIVERT NH fuse switch-disconnectors a preferred choice in switching and distribution units.

Features

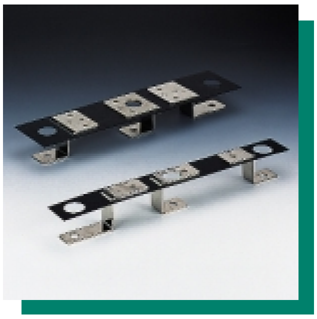
- Fully insulated and full shock-hazard protection
- Symmetrical construction (choice of cable output on top or bottom)
- Exclusive use of halogen-free, flame resistant plastics
- Simple lead sealing of switch without accessory possible
- Three fixing options: screw, clamp, aluminum clamp
- Lid positioning: parking
- Direct mounting on busbar (size 00 on 100 mm system)
- No drilling hole
- Size 00 with adapter for 60 mm and 185 mm systems
- Corresponding lids for adjusting to sizes 1, 2, 3)
- Laterally set ventilation slots for avoiding switching performance failures in vicinity
- Minimal installation time
- Contacts from one piece
- Installation possible while voltage present

Fuse switch-disconnectors MULTIVERT



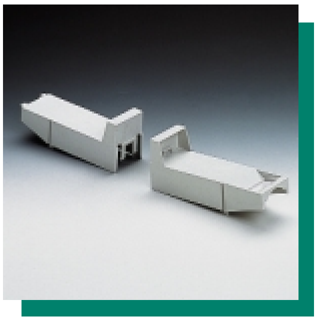
MULTIVERT
NH-fuse switch-disconnector
size 00
~ 690 V 160 A
for busbar systems 100 mm

Size			Catalog Number	Reference Number	Packing
00	160	Screw M8	08389.000000	E200725	1



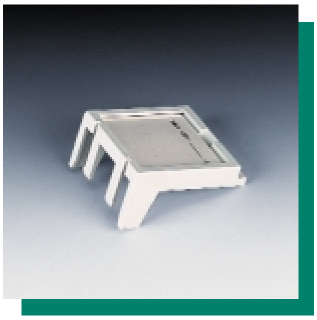
MULTIVERT Adapter for size 00

Size		Catalog Number	Reference Number	Packing
00	adapter for 185 mm-Syst.	08379.011850	Q216628	1
00	adapter for 185 mm-Syst.	08379.021850	C217145	1
00	adapter for 60 mm-Syst.	08379.010600	S216124	1



MULTIVERT cover for size 00
and 1, 2, 3

Size		Catalog Number	Reference Number	Packing
00	Cover	08374.000000	X214081	1



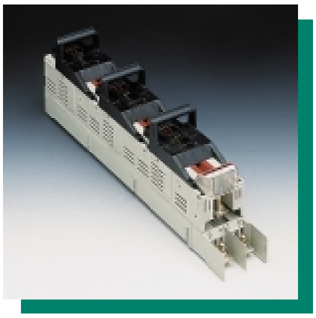
MULTIVERT Name plate
for size. 00

Size		Catalog Number	Reference Number	Packing
00	Name plate	08377.000000	K215611	1

MULTIVERT Name plate
for size. 1, 2, 3

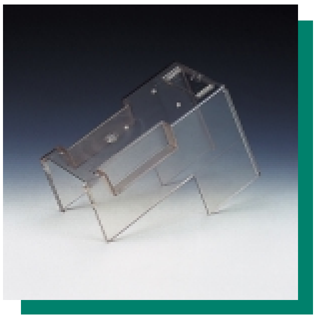
Size		Catalog Number	Reference Number	Packing
1- 3	Holder f.Name plate	08385.000005	B222181	1

Fuse switch-disconnectors MULTIVERT



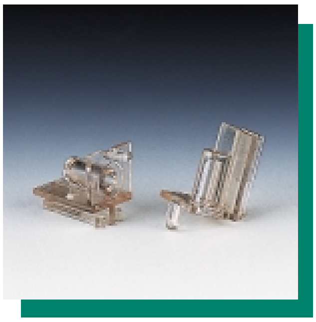
MULTIVERT
NH-fuse switch-disconnector
Size. 1 ~ 690 V 250 A
Size. 2 ~ 690 V 400 A
Size. 3 ~ 690 V 630 A
for busbar systems 185 mm

Size			Catalog Number	Reference Number	Packing
single pole busbar					
1	250	Screw M10	08391.000005	T201267	1
2	400	Screw M12	08392.000005	Q207359	1
3	630	Screw M12	08393.000005	Z212036	1
three pole busbar					
1	250	Screw M10	08395.000005	D201782	1
2	400	Screw M12	08396.000005	T211525	1
3	630	Screw M12	08397.000005	R212558	1



Cable Cover for
MULTIVERT Size. 1, 2, 3

Size			Catalog Number	Reference Number	Packing
1, 2, 3		top start	08380.000005	G217655	1
1, 2, 3		bottom start	08381.000005	Q218169	1



Sealing Holder for MULTIVERT
Size. 1, 2, 3

Size			Catalog Number	Reference Number	Packing
1, 2, 3		Sealing holder	08383.000005	R219205	1



Side distance holder for
MULTIVERT Size 00, 1, 2, 3

Size			Catalog Number	Reference Number	Packing
00 1,2,3		Side distance holder	08382.000005	D218687	1

Fuse switch-disconnectors MULTIVERT



Residual field
Breite: 50 mm
for busbar systems
100/185 mm

Size			Catalog Number	Reference Number	Packing
for 100 mm busbar systems					
			08373.001000	C213074	1
for 185 mm busbar systems					
			08373.001850	X213575	1



Claw clamp set for MULTIVERT Size 00

Size			Catalog Number	Reference Number	Packing
00		Claw clamp set	08376.000000	K215105	1



Clamp terminal set for MULTIVERT

Size			Catalog Number	Reference Number	Packing
00	Clamp terminal set		08375.000000	E214594	1



Clamp set for aluminum for MULTIVERT Size 00

Size			Catalog Number	Reference Number	Packing
00		Clamp set for aluminum	08295.007405	R211523	1



Clamp set for aluminum for MULTIVERT Size 1, 2, 3

Size			Catalog Number	Reference Number	Packing
1,2,3		Clamp set for aluminum	08384.000005	T219736	1

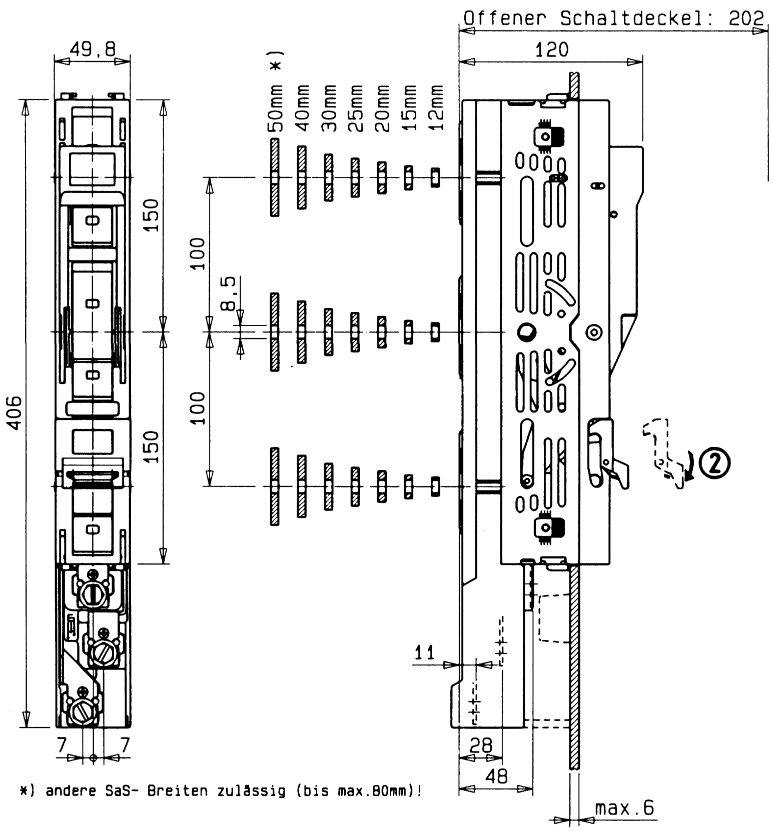
Fuse switch-disconnectors MULTIVERT

MULTIVERT NH Fuse Switch-disconnectors

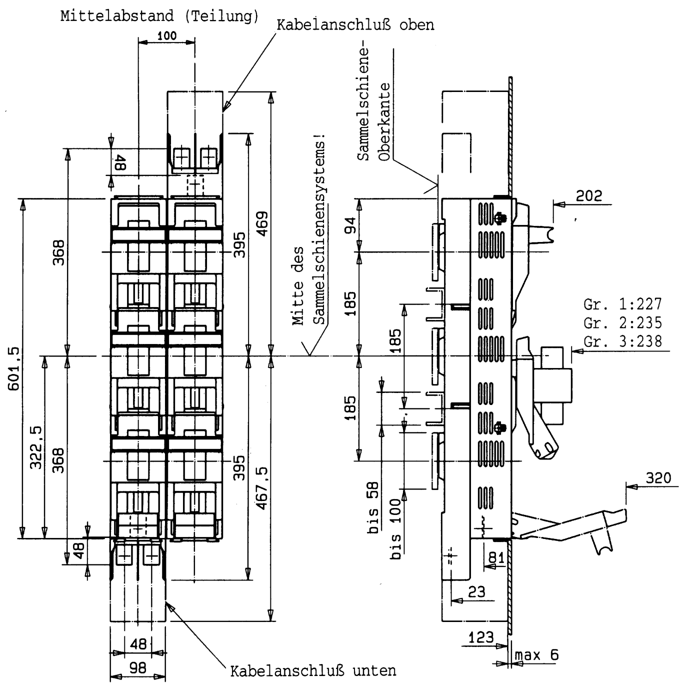
Classification	LV HRC in-line fuse switch-disconnector to DIN VDE 0660 Part 107			
Standards	DIN VDE 0660 Part 107, EN 60947-3, IEC 947-3, DIN 43623			
Sizes	**Size 00**	**Size 1**	**Size 2**	**Size 3**
Number of poles	3-pole	3-pole	3-pole	3-pole
Number of switchable poles	3-pole	1-, 3-pole	1-, 3-pole	1-, 3-pole
Rated uninterrupted current I_n	160 A	250 A	400 A	630 A
with fuse-links to DIN	(100 A bei 660 V)			
VDE 0636 and DIN 43620				
thermal current Ith	160 A	250 A	400 A	630 A
with connecting blades	250 A	400 A	630 A	1000 A
Rated duty	cont. duty	cont. duty	cont. duty	cont. duty
Rated operational voltage U_e	~ 660 (~ 690) V	~ 660 (~ 690) V	~ 660 (~ 690) V	~ 660 (~ 690) V
Rated frequency	45-62 Hz	45-62 Hz	45-62 Hz	45-62 Hz
Rated insulation voltage U_i	1000 V	1000 V	1000 V	1000 V
Rated impulse strengh U_{imp}	8 kV	12 kV	12 kV	12 kV
Rated short-time breaking-capacity I_{cm}	4000 A	5000 A	8000 A	12.600 A
(1 sec. with connecting blades)				
Rated short-circuit making capacity	50 kA	50 kA	50 kA	50 kA
With fuse	size 00/160 A	size 1/250 A	size 2/400 A	size 3/630 A
(at ~ 500 V and rapid making)				
Rated breaking capacity				
Rated operational current I_e with				
AC 23B/400 V cos = 0,35	160 A	125 A	200 A	315 A
AC 22B/500 V cos = 0,65	160 A	250 A	400 A	630 A
AC 21B/660 V cos = 0,95	100 A	125 A	300 A	250 A
DC 22B/440 V	160 A	---	---	---
Admiss. ambient temperature	– 25 bis + 55°C	– 25 bis + 55°C	– 25 bis + 55°C	– 25 bis + 55°C
Storage temperature	– 40 bis + 80°C	– 40 bis + 80°C	– 40 bis + 80°C	– 40 bis + 80°C
Mechanical service life (switchings)	1000	1000	1000	1000
Mechanical and				
electrical service life	min. 50 switchings at rated duty			
Max. power loss	12 W	23 W	34 W	48 W
(of fuse links)				
Standard screw connection	M8 / 15 Nm	M10 / 38 Nm	M12 / 38 Nm	M12 / 48 Nm
...				
Position of normal use				
Position	horizontal or vertical			
Degree of protection	IP 20	IP 20	IP 20	IP 20

Fuse switch-disconnectors MULTIVERT

Multivert size 00 Art.-Nr. 8389



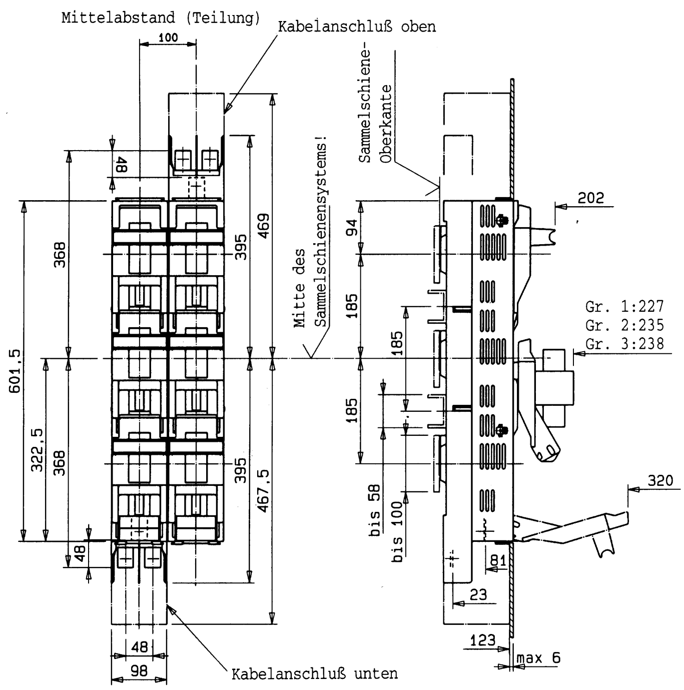
Maße MULTIVERT Gr. 1, 2, 3



Fliegende Maße beziehen sich auf Sammelschienenoberkante!

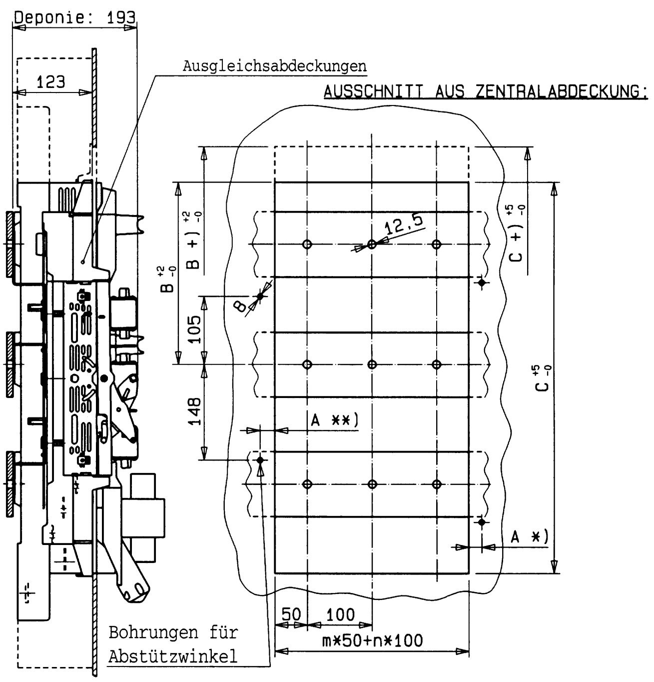
Fuse switch-disconnectors MULTIVERT

Multivert size 1, 2, 3



Fliegende Maße beziehen sich auf Sammelschienenoberkante!

Combination size 00 with size 1, 2, 3



Ausschnitt	B	B +)	C	C +)
	280	335	603	658

	Abstützwinkel	A
*)	MV 250-630	20
**)	MV 160	22,5

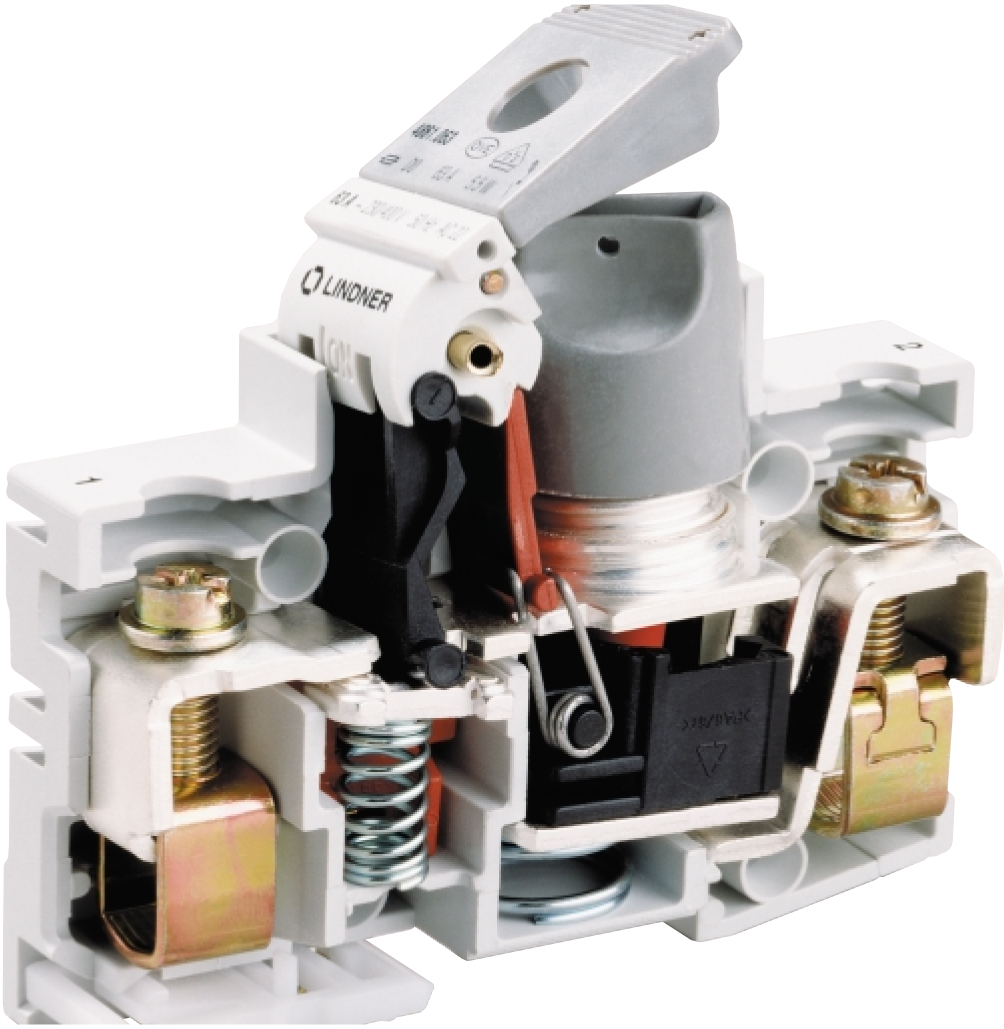
m – Anzahl der Größe 00
n – Anzal der Größen 1 bis 3

m/2 – Anzahl der Doppeladapter
+) – Ausschnitt inkl. Beschriftungsträger

Fuse switch-disconnectors LINOCUR

DO LINOCUR Switch-Disconnector for NEOZED Fuses

63 A D02 ~230/400 V (~440V)



Specifications:

DIN VDE 0638
EN 60947-3
DIN VDE 0660 Part 107
IEC 60947-3
EN 60947-3
VBG4m

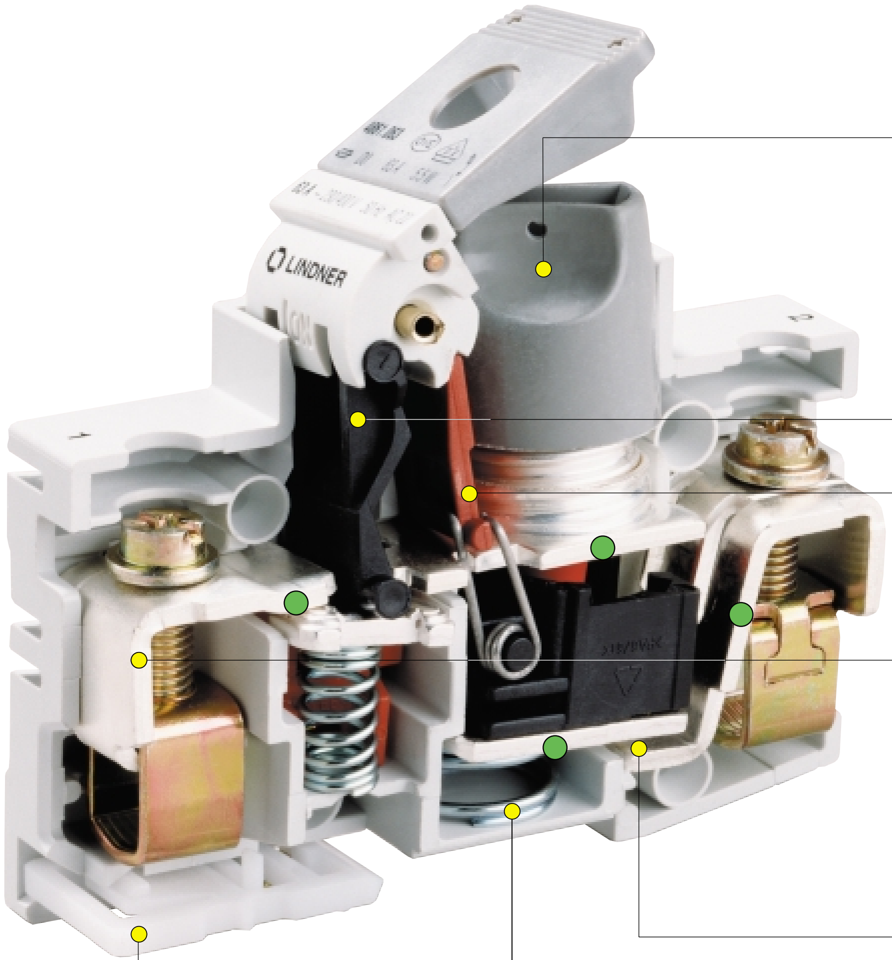
DO LINOCUR combines a fuse base and separately mounted NEOZED 63 A switches in one enclosure. As principle of their operation, both switches are open when the device is disconnected and when the fuse-link is removed.

Approval Symbols:

Symbol	Country/Body	Symbol	Country/Body
VDE	Germany		Bureau Veritas
ÖVE	Austria	Lloyd's Register	British Lloyd's Register of Shipping
D	Denmark		
	German Lloyd	BV	Bureau Veritas

Fuse switch-disconnectors LINOCUR

D0 LINOCUR Switch-Disconnector
A New Generation of New Technology



New ergonomically designed screw caps

Switch-disconnector with spring-operated mechanism for automatic connection

Locking device

Dual-function terminal

Break contact guarantees complete, safe isolation with infeed from above

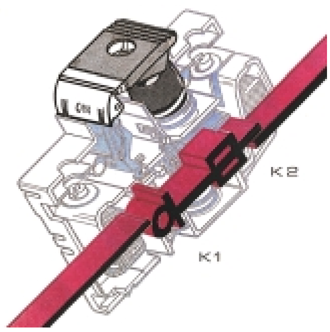
Foot contact spring guarantees constant contact pressure

Snap-in spring catch

Tiple automatic safety feature

Fuse switch-disconnectors LINOCUR

DO LINOCUR Switch-disconnector for NEOZED Fuses

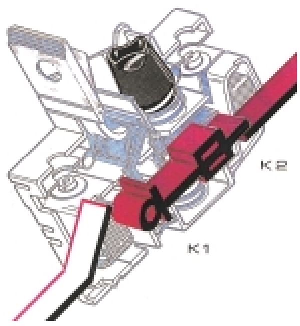


Operating Principle

The new D0 LINOCUR combines a fuse base and two separately mounted switches (K1 & K2) in one enclosure.

As a principle of operation, both switches are open when the device is disconnected and when the fuse-link is removed.

Switch K1 is a switch-disconnector as per DIN VDE 0660 Part 107, and provides for on-load disconnection of electrical equipment.

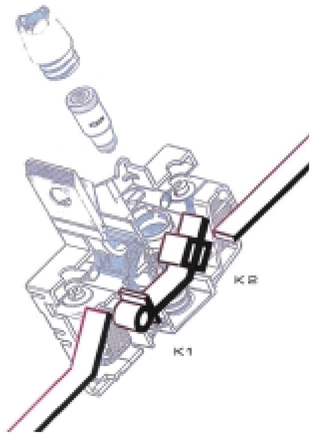


Switch K2 is designed as break contact without load-switching capacity and guarantees complete isolation of the fuse component when infeed is from above and the fuse-link is removed.

Switch K2 can only be activated when switch-disconnector K1 is open, guaranteeing complete isolation of the device

Connection in Circuit

D0 LINOCUR can only be connected in circuit when the fuse-link (or all fuse-links in multi-pole equipment) is firmly screwed in by its screw cap. Switch K2 closes simultaneously as the fuse-link is screwed in. The fuse component is then live when infeed is from above. On activating the switch knob, the load is connected automatically by a spring-operated mechanism, switch K1 closes and D0 LINOCUR is energized.



Disconnection and Fuse Changes

Switch-disconnector K1 opens when the switch knob is turned to the “OFF” position. The electrical load is disconnected on-load from mains and LINOCUR is de-energized. If a fuse needs to be changed, K2 opens atuomatically as the fuse-link is unscrewed, ensuring that when infeed is from above, the fuse component is fully isolated.

Fuse switch-disconnectors LINOCUR



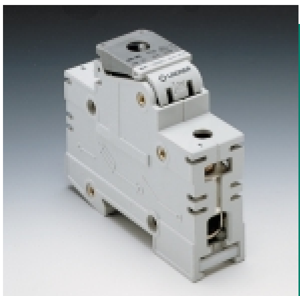
DO LINOCUR Switch-disconnector ~ 400 V, D01

Rated current in A	Number of poles	Modular spacing		Conductor cross-section mm² max.	Catalog Number	Reference Number	Packing
to 16	1	1		6	02811.016000	V213021	5
	2	2		6	02812.016000	E215560	2
	3	3		6	02813.016000	M216073	1



DO LINOCUR Switch-disconnector ~ 400 V, D02
sealable, with snap-on mounting for top-hat rails as per DIN EN 50022

Rated current in A	Number of poles	Modular spacing		Conductor cross-section mm² max.	Catalog Number	Reference Number	Packing
to 63*	1	1,5	Dual-function terminals	35	04861.063000	P222883	3
	1+N	3		35	04861.063100	Z200674	2
	2	3		35	04862.063000	D215053	2
	3	4,5		35	04863.063000	T219690	1
	3+N	6		35	04863.063100	A214544	1
Dummy D02					01825.000000	F215055	1



DO LINOCUR Switch-disconnector for construction ~ 440 V, D02
sealable, with snap-on mounting for top-hat rails as per DIN EN 50022

Rated current in A	Number of poles	Modular spacing		Conductor cross-section mm² max.	Catalog Number	Reference Number	Packing
to 63*	1	1,5	Dual-function terminals	35	04861.063040	C215052	3
	2	3		35	04862.063040	N216074	2
	3	4,5		35	04863.063040	Z211990	2
	3+N	6		35	04863.063140	P216075	1

* LINOCUR is available on request in 25, 35 and 50 A with permanently fitted and non-interchangeable adapter sleeves.
In versions 1+N and 3+N, the N-conductor leads when making and lags when breaking.
* NEOZED fuse-links and adaptor sleeves are to be ordered as optional extras.

Fuse switch-disconnectors LINOCUR



Replacement screw-cap D0 LINOCUR
insulating with sealing hole

For base	Rated current in A	Thread / ID colour	Catalog Number	Reference Number	Packing
with testing hole					
D02	63	E18	01715.000220	C214546	10
without testing hole)					
D02	63	E18	01715.000020	Y213024	10
D01	16	E14	00750.000000	V219691	20



Adapter
for 40, 50 or 60 mm busbar systems

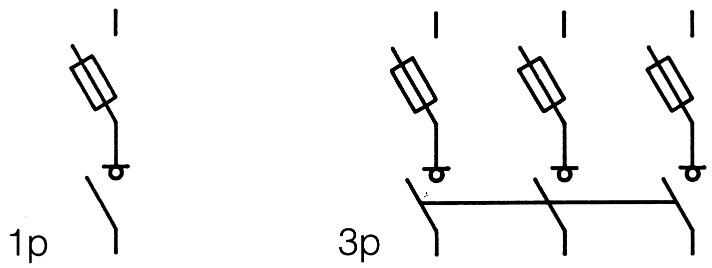
Version / Cross-section			Catalog Number	Reference Number	Packing
40 mm System 3 x 63 A					
Mono-A.	adjustable	1	02805.100000	E201783	1
Mono-A.	adjustable	1	03805.400000	W219692	1
Dual-A.	adjustable	2	03807.400000	R212512	1
Dual-A.	adjustable	2 mittig	03806.400000	C201735	1
50 mm System 3 x 63 A					
Mono-A.	adjustable	1	03805.500000	A222134	1
Dual-A.	adjustable	2	03807.500000	Z213025	1
Dual-A.	adjustable.	2 mittig	03806.500000	V206604	1
60 mm System 3 x 63 A					
Mono-A.	adjustable	1	03805.600000	T222887	1
Dual-A.	adjustable	2	03807.600000	X213529	1
Dual-A.	adjustable	2 mittig	03806.600000	Q211476	1
Dual-A.	adjustable	1	03807.610000	D214547	1
Dual-support	adjustable	0	03807.630000	G215056	1

Fuse switch-disconnectors LINOCUR

Technical Data

Classification	Switch-disconnector for fuses to DIN VDE 0660 Part 107
Specifications	DIN VDE 0660 Part 107, EN 60947, IEC 60947-3, DIN VDE 0636 Part 41, IEC 60269-3, DIN VDE 0638, DIN VDE 43880
Sizes	D02
Number of poles	1-, 2-, 3-pole 2-pole (1+N), 4-pole (3+N)
Utilization categories	gL-gG, aM, gG nur mit Einschränkung
Nominal current I_n	2 - 63 A
Nominal voltage U_n	1-pole: ~ 230 V 2-, 3-, 4-pole: ~ 400 V Shipbuilding: ~ 400 V per pole: - 65 V
Nominal frequency	50 - 60 Hz
Rated short-circuit breaking capacity	50 kA
Application category	AC 22 B DC 22 B/ – 65 V/Pol AC 23 B/~ 400 V 50 A AC 23 B/~ 440 V 35 A
Attachment types/cross-sections	D02: 35 mm² M5 Pozidriv screws covered safe from finger-touch to accident prevention norm VBG 4
Degree of protection	IP 20
Attachment method	Snap-on mounting on top-hat rails to DIN EN 50022 Latch-down snap-on device to busbar system using adaptor
Materials	Impact-resistant insulating material RAL 7035 insulating material, self-extinguishing, halogen-free entspr. DIN VDE 0106 Part 100, VBG 4

Graphical symbol:

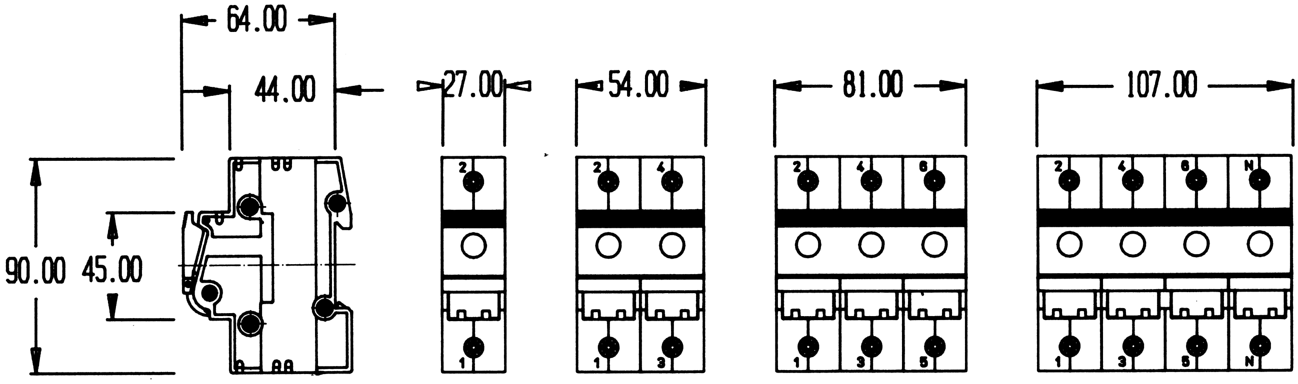


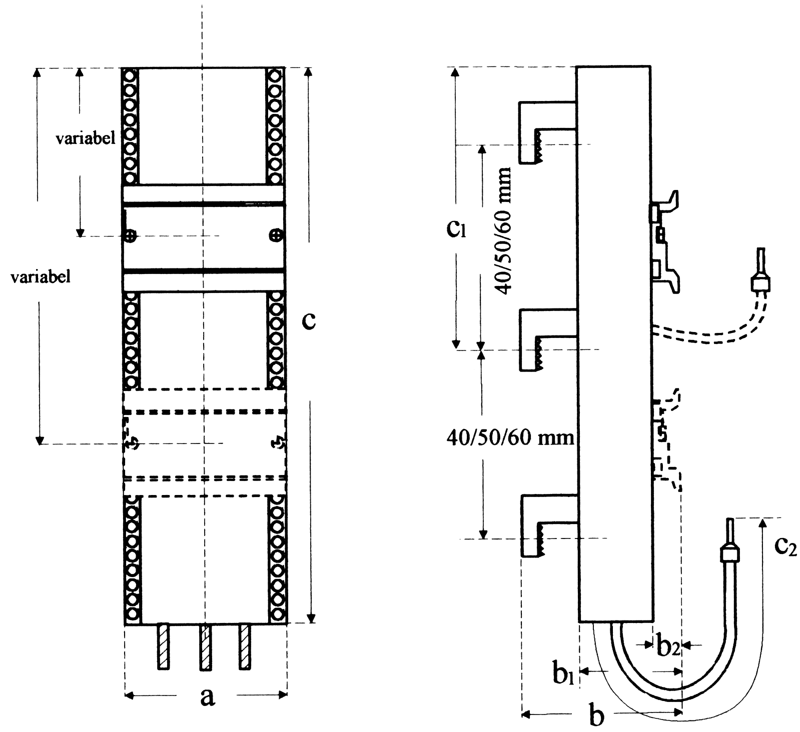
Fuse switch-disconnectors

LINOCUR

DO LINOCUR Switch-disconnector ~ 400 V

Adapter for 40, 50 or 60 mm busbar systems





NEOKIT
Switchable Fuse-Base

2 - 16 A, ~ 230/400 V

Approvals

Germany

Austria

Specifications and test marks:

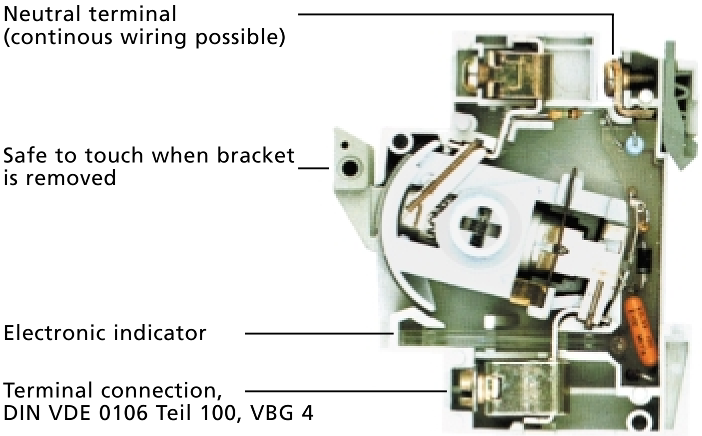
DIN VDE 0638
DIN VDE 0636
ÖVE SN 40
IEC 947-3
VBG 4, DIN VDE 0106 Part 100
DIN 43 880

Construction

NEOKIT is a switch-fuse combination enclosed in a common housing. Both the pitch dimensions of the fixtures and the dimensions of the housing comply with DIN 43880. The depth dimension for switches is 68 mm. NEOKIT is suitable for snap mounting on DIN-rails in accordance with DIN EN 50022. The terminals on both the ingoing and the outgoing sides are shielded to safe-guard against finger or hand contact.

The NEOKIT system allows the fuse to be changed without danger, while preventing the use of higher current-level fuses.

When replacing NEOZED fuse-links, the fixture is turned off. All accessible metal parts are free of current as prescribed in DIN VDE 0106 part 100.



NEOKIT is available either with or without electronic monitoring of operating readiness. For fixtures with monitoring electronics, the N-conductor must be connected.

Fuse switch-disconnectors NEOKIT



NEOKIT* - Switchable fuse-base D01 ~ 230/400 V with indicator, sealable, with snap mounting for DIN-rails as per DIN EN 50022.

Rated current in A	Number of poles		Conductor cross-section mm² max.	Catalog Number	Reference Number	Packing
2	1	Terminal clamp	4	08490.021000	Y218636	10
4	1		4	08490.041000	X219693	10
6	1		4	08490.061000	V222888	10
	2		4	08490.062000	R201219	5
	3		4	08490.063000	W206605	3
10	1		4	08490.101000	A211991	10
	2		4	08490.102000	A213026	5
	3		4	08490.103000	H215057	3
16	1		4	08490.161000	H217610	10
	2		4	08490.162000	Q219158	5
	3		4	08490.163000	C222136	3



NEOKIT*- Switchable fuse-base D01 ~ 230/400 V without indicator, sealable, with snap mounting for DIN-rails as per DIN EN 50022.

Rated current in A	Number of poles		Conductor cross-section mm² max.	Catalog Number	Reference Number	Packing
2	1	Terminal clamp	4	08490.021100	P219157	10
4	1		4	08490.041100	B222135	10
6	1		4	08490.061100	D200678	10
	2		4	08490.062100	D201736	5
	3		4	08490.063100	R211477	3
10	1		4	08490.101100	S212513	10
	2		4	08490.102100	W214034	5
	3		4	08490.103100	B217098	3
16	1		4	08490.161100	N218121	10
	2		4	08490.162100	Y219694	5
	3		4	08490.163100	W222889	3

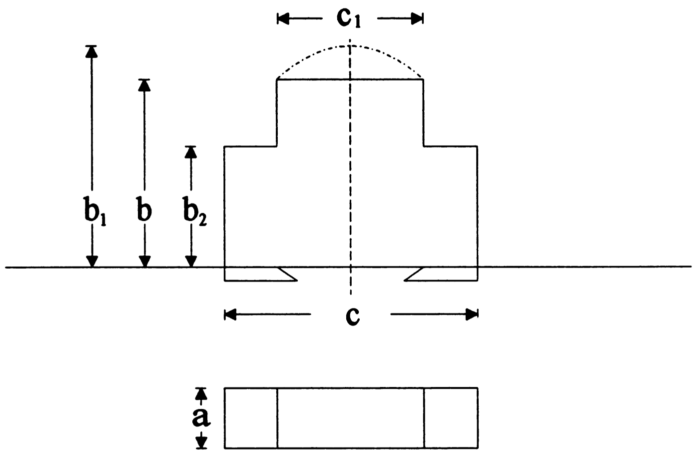
* Fuse-bases are supplied with NEOZED fuse-links.



NEOKIT- Cartridge key 2 A to 16 A

Model		Catalog Number	Reference Number	Packing
2 A, ~ 400 V, 1pol.		08490.021009	S201220	10
4 A, ~ 400 V, 1pol.		08490.041009	E201737	10
6 A, ~ 400 V, 1pol.		08490.061009	S211478	10
3pol.		08490.063009	T212514	10
10 A, ~ 400 V, 1pol.		08490.101009	B213027	10
3pol.		08490.103009	X214035	10
16 A, ~ 400 V, 1pol.		08490.161009	E214548	10
3pol.		08490.163009	H215563	10

Fuse switch-disconnectors NEOKIT



	a	b	b_1	b_2	c	c_1
1p	17,5	68	58	37	77	45
2p	35,5	68	58	37	77	45
3p	53,5	68	58	37	77	45

Technical specifications

Classification	Switch-fuse disconnector for fuses as per DIN VDE 0660 Part 107
Specifications	DIN VDE 0660 Part 107, EN 60947, IEC 947-3, DIN VDE 0636 Part 41, IEC 269-3, DIN VDE 0638, DIN VDE 43880
Sizes	D01
Number of poles	1-, 2-, 3-pole
Utilization category	gL-gG
Nominal current I_n	2 - 16 A
Nominal voltage U_n	1-ole: ~ 230 2-, 3-pole: ~ 400 V
Nominal frequency	45 - 62 Hz
Nominal short-circuit strength	50 kA
Application category	AC 22B
Admissible ambient temperature	-5 bis +40°C Mean value over 24 hours: <35°C
Attachment types/cross-sections	4 mm^2 clamp-terminals Shielded safe from finger-touch as per accident prevention norm VBG4
Degree of protection	IP 20
Attachment method	Snap-fitting to top-hat rails to DIN EN 50022 Latch-on snap-on fitting
Materials	Impact-resistant insulating material RAL 7035 insulating material, self extinguishing, halogen-free

Universal Support TRI60

TRI60

60 mm busbar system

The TRI 60 busbar system by LINDNER is the modern ergonomic answer to power distribution up to 630 A.

The TRI 60 system simultaneously combines the mounting and connection (power supply) of power-distribution equipment, saving the user a great deal of time and money in the process.

Besides the advantage of practical power distribution through use of clip-on equipment, the TRI 60 busbar system has well-conceived safety features and last but not least, an attractive and clearly arranged design.

Busbars

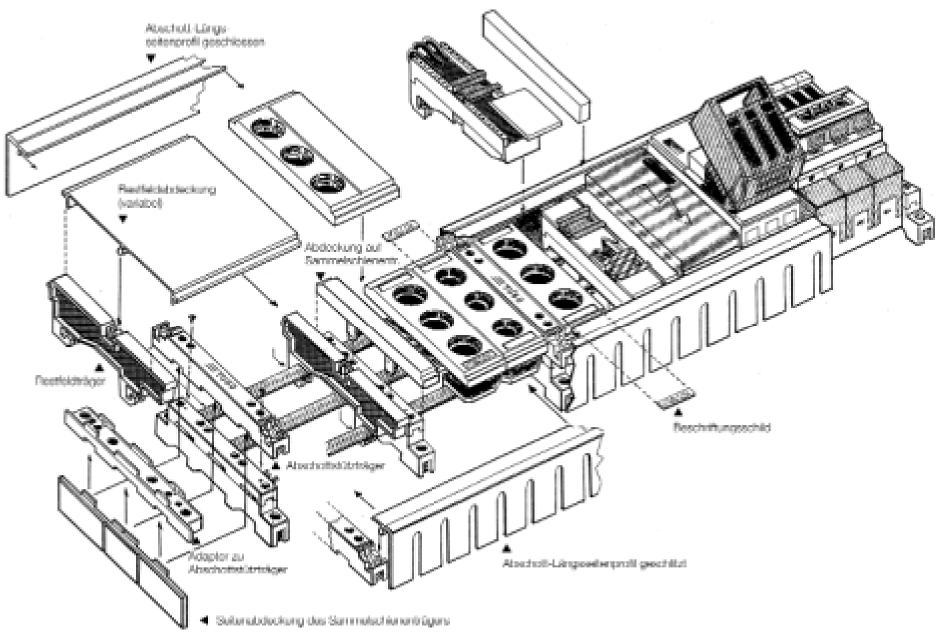
Current-carrying capacity mounted in switchgear

35°C ambient temperature

65°C busbar temperature

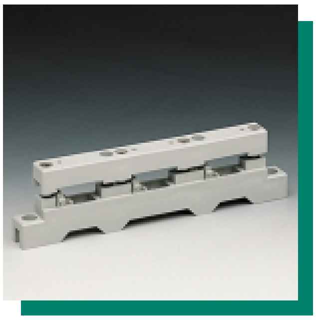
Dimensions in mm	Continuous current	Rated fuse current*
30 x 10	630 A	630 A
25 x 10	580 A	500 A
20 x 10	520 A	500 A
30 x 5	447 A	400 A
15 x 10	447 A	400 A
25 x 5	400 A	400 A
12 x 10	360 A	315 A
20 x 5	320 A	315 A
15 x 5	250 A	250 A
12 x 5	200 A	200 A

* Fuse-links within utilization category gL-gG to DIN VDE 0636.
  Note continuous current if using other upstream protection devices.



Universal Support

TRI60



Universal busbar support, three-pole, as per VDE 0660 Part 500, **with additional mounting holes outside**, allowing attachment of PE/N busbar supports No. 173 and 174
Color:
RAL 7035 – Light grey

Version	for bars in mm	Catalog Number	Reference Number	Packing
4 mounting holes	12 x 5 – 10 15 x 5 – 10 20 x 5 – 10 25 x 5 – 10 30 x 5 – 10	00170.000000	B214039	10



Universal busbar support, three-pole, as per VDE 0660 Part 500, **with inside mounting holes,**for bus-mounting equipment ranging up to 630 A rated current, with adjustable stop for adaption to E-Cu busbars 12 to 30 mm wide and in 5 to 10 mm gauge; bar clearance 60 mm, rated voltage up to 660 V, 50/60 Hz to VDE 0660
Color:
RAL 7035 – Light grey

Version	for bars in mm	Catalog Number	Reference Number	Packing
2 mounting holes	12 x 5 – 10 15 x 5 – 10 20 x 5 – 10 25 x 5 – 10 30 x 5 – 10	00171.000000	V216080	10



N/PE busbar support for attachment to busbar support No. 170 for 4-pole and 5-pole systems; No. 173 can also be used as individual support.

Version	for bars in mm	Catalog Number	Reference Number	Packing
1 mounting hole	12 x 5 – 10 15 x 5 – 10 20 x 5 – 10 25 x 5 30 x 5	00173.000000	E218642	10

No. 174 can only be used together with part 170.

Version	for bars in mm	Catalog Number	Reference Number	Packing
1 mounting hole	12 x 5 – 10 15 x 5 – 10 20 x 5 – 10 25 x 5 30 x 5	00174.000000	B222894	10

Universal Support

TRI60



NEOZED bus-mounting fuse base, 3-pole, for 60 mm busbar systems
Choice of busbar width from 12 to 30 mm.
Color:
RAL 7035 – light grey



D type bus-mounting fuse base, 3-pole, for 60 mm busbar systems
Choice of busbar width from 12 to 30 mm.
Color:
RAL 7035 – light grey

Rated current in A	Number of poles	Rated voltage in V	Conductor cross-section mm² max.	Catalog Number	Reference Number	Packing
Adapter sleeve system, to DIN VDE 0636 Part 41						
D02	63	~ 400	5 /10	01750.000000	K222143	10
D02	63	~ 400	10	01751.000000	M201744	10
Adapter ring system						
DII	25	~ 500	5/10	00150.000006	S207430	10
DII	25	~ 500	10	00151.000006	Y211529	10
DIII	63	~ 690	5/10	00160.000006	B213579	10
DIII	63	~ 690	10	00161.000006	B214085	10
Adapter screw system						
DII	25	~ 500	5/10	00152.000006	D212040	10
DII	25	~ 500	10	00153.000006	W212562	10
DIII	63	~ 690	5/10	00162.000006	H214597	10
DIII	63	~ 690	10	00163.000006	N215108	10



Cover for NEOZED fuse base, 3-pole
Color :
RAL 7035 – light grey



Cover for D-type fuse base, three-pole
Color:
RAL 7035 – light grey

Size	Version	Catalog Number	Reference Number	Packing
D02	1 -single 27 mm wide	01755.000000	D212523	20
D02	1 1/3 -fach 36 mm wide	01756.000000	N214556	10
D02	2 -double 54 mm wide	01757.000000	B216592	10
DII	1 -single 42 mm wide	00155.000006	G213078	10
	2 -double 84 mm wide	00157.000006	B211486	10
DIII	1 -single 57 mm wide	00165.000006	P215615	10
	2 -double 114 mm wide	00167.000006	G218644	10

Universal Support

TRI60



LV HRC (NH) fuse switch-disconnector size 00 for disc attachment to busbar
as per EN 60947-3

Rated current in A	Terminal type	Conduction cross-section in mm²	Catalog Number	Reference Number	Packing
feeders upward/downward					
160	screw	1,6 - 70	08363.000000	P215109	1
160	clamp	6 - 70	08363.200000	Q215616	1

Feature:
Output possible from top or bottom by turning the busbar centering unit, contact cover and lid.

Clearly visible parking position of lid for greater safety during service works in the installation

More features

- convenient sealing of cap and contact cover
- with labelling area for TRI 60 labelling plates (article no. 154)
- all plastic materials are halogen-free and can be recycled
- the new TRI 60 bus-mounting fuse switch-disconnector is in accordance with the latest standards as per DIN VDE 0660/part 107, EN 60 947-3 and IEC 60947-3. Approval: ÖVE
- upon request: special terminal set for aluminium conductors up to 95 mm ².
- a signaling switch to signal cap-position and/or a replacement cap fitted with a motor protection switch for fuse-monitoring purposes can be supplied on request.



LV HRC (NH) fuse switch-disconnector size 1
for attachment with adapter, article no. 8361.2, for bar gauge 5 to 10 mm

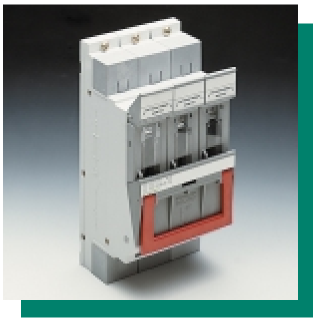
feeders downward

			Catalog Number	Reference Number	Packing
250	screw M10	120	08361.000000	H225729	1

Busbar adapter
for disconnector no. 8361

		120	08361.200000	J225730	2

Universal Support TRI60



NH00 LINOCUR switch-disconnector for NH fuses as per:
EN 60947-3
IEC 60947-3
DIN VDE 0660
Part 107

Poles	Connection	Catalog Number	Reference Number	Packing
Bemessungsstrom/-spannung: 125A bei ~500V, 100A bei ~660V				
3	Kombianschluß Schraube/	08603.000000	Y212035	1
3	Schelle/3 x 10mm²	08603.220000	W213574	1



Adapter
suitable for
NH00 LINOCUR 8603.2
and 8603.22

Version	max. Cu bars mm	Catalog Number	Reference Number	Packing
60 mm System	30 x 10	08600.600000	F217654	1

NH bus-mounting fuse base, 3-pole
for bar gauge 5 to 10 mm, with touch guard

Size	Rated current in A	Terminal type	conductor cross-section in mm²	Catalog Number	Reference Number	Packing
feeders upward						
00	160	screw M8	70	08350.000000	X212563	4
00	160	clamp	70	08350.200000	H213079	4
feeders downward						
1	250	screw M10	120	08351.000000	C213580	1
2	400	screw M10	240	08352.000000	C214086	1

Universal Support TRI60



Terminal plate, 3-pole

bar gauge in mm	Conductor cross-section in mm²	Catalog Number	Reference Number	Packing
5	16-120	08355.050000	E212041	1
10	16-120	08355.010000	Z211530	1

terminal compartment 17x16mm

Cover Only

bar gauge in mm	Conductor cross-section in mm²	Catalog Number	Reference Number	Packing
		08358.000000	H218691	1



Universal terminal

as per
DIN VDE 0606
for flexible connection of wires, for all busbar widths 5 mm or 10 mm terminal version: terminals always open

Conductor Size in mm²	Terminal compartment in mm	Catalog Number	Reference Number	Packing
for 5 mm busbar width				
1,5 – 16	7,5 x 6	01760.050160	K200730	100
4 – 35	10,8 x 7,5	01760.050350	Z201272	50
16 – 70	13 x 13	01760.050700	J201787	25
16 – 120	17 x 15	01760.051200	V207524	25
for 10 mm busbar width				
1,5 – 16	7,5 x 6	01760.010160	W219209	100
4 – 35	10,8 x 7,5	01760.010350	Y219740	50
16 – 70	13 x 13	01760.010700	F222185	25
16 – 120	7,5 x 15	01760.011200	B222940	25



Adapter plate terminals

for connection of flexible copper strips or rigid conductor bars

120		01759.201600	M217108	10

Universal Support

TRI60

All parts of LINDNER TRI 60 shock-hazard protection system are halogen- and clorine-free and may be recycled

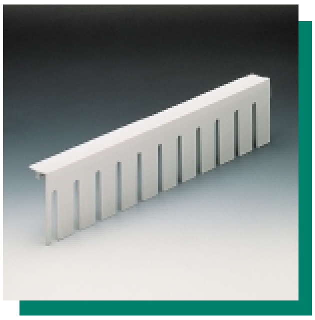


Support for compartment side profile
for attachment to busbar support
Color:
RAL 7035 – light grey

Adapter for side profile support (art. no. 140)

System height in mm			Catalog Number	Reference Number	Packing
32			00140.000000	H218645	10
42			00240.000000	X218129	10

Note:
Catalog Numnber 240 can also be mounted under the universal busbar support (Catalog Numnber 170).
Allows the complete busbar system to be lifted at 10 mm.



Compartment side profile
Color:
RAL 7035 – light grey

System height in mm			Catalog Number	Reference Number	Packing
32	closed		00142.000000	D222896	5 x 2 m
32	slotted		00143.000000	T215573	5 x 2 m
42	closed		00242.000000	F222898	5 x 2 m
42	slotted		00243.000000	W206743	5 x 2 m

Universal Support

TRI60



Side cover
for busbar support, attachable to article no. 140 (240) from below
Color:
RAL 7035 – light grey

System height in mm			Catalog Number	Reference Number	Packing
32/42			00145.000000	W218128	10



Busbar support cover
Color:
RAL 7035 – light grey

System height in mm			Catalog Number	Reference Number	Packing
32 42			00147.000000 00247.000000	E222897 N213038	10 10



Residual field support
Color:
RAL 7035 – light grey

System height in mm			Catalog Number	Reference Number	Packing
32 42			00148.000000 00248.000000	D211488 W215069	10 10



Residual field cover
Variable, can be cut to length
Color:
RAL 7035 – light grey

System height in mm			Catalog Number	Reference Number	Packing
32/42			00149.000000	F214043	10



Insulating side cover with screws
To cover sides of busbar ends
Color:
RAL 7035 – light grey
to be screwed to top section of support no. 170 to 171

System height in mm			Catalog Number	Reference Number	Packing
			00172.000000	D216594	20

Note:
To be used only by TRI 60 bus bar systems without TRI 60 shock-hazard protection system

Universal Support

TRI60



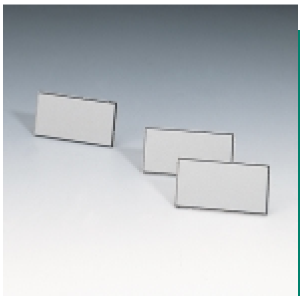
Adapter for panel components with DIN-rails as per EN DIN 50022, plastic

Adapter with wire-connection

Adapter without wire-connection

Rated current in A	Version	Catalog Number	Reference Number	Packing
32	54 mm wide, 1 rail	03800.211000	Y216129	1
32	54 mm wide, 2 rails	03800.221000	V216632	1
63	54 mm wide, 1 rail	03800.311000	G217149	1
63	72 mm wide, 1 rail	03800.312000	L217659	1
63	81 mm wide, 1 rail	03800.313000	W218174	1
	54 mm wide, 2 rails	03801.021000	J218692	1
	54 mm wide	03802.001000	X219210	10
	81 mm wide	03802.003000	Z219741	10

TRI 60 marking system



Self-adhesive labelling plates
Color: silver grey
Material: DUOMATT
for non-smudge writing or engraving

Version		Catalog Number	Reference Number	Packing
20 x 10 mm		01754.000000	P213039	252
30 x 10 mm		00154.000000	P200688	162

TRI 60 labelling plates are supplied in specified packaging units on an approximately DIN A4-sized support sheet. These sheets fit easily into normal commercial engraving or plotting machines.

The labelling plates fit exactly into the pockets on the covers of bus-mounting fuse-bases (article no. 1754 fits into all covers for NEOZED bus-mounting fuse-bases, article no. 154 into all covers for D-type bus-mounting fuse-bases, terminal plates and LV HRC 00 bus-mounting fuse switch-disconnectors) and are silver-grey in color to match the TRI 60 design.

Adhesive setting time: approx. 24 hours.

TRI 60 labelling plates can also be used in severe environmental conditions once their adhesive has set (e.g. in the chemical industry).

Universal Support

TRI60



Distance clip, 9 mm
To enlarge wiring space for NEOZED fuse-bases. For easier mounting, simply plug the DO-base distance clip into busbar. Can be fitted on bars in 5 and 10 mm gauge.
If using these clips,, cover 1756 (36 mm) should also be provided.

Size	Busbar gauge in mm		Catalog Number	Reference Number	Packing
DO	5 - 10		01752.000000	Q201747	50



NEOZED (DO) and D screw-caps
Material: plastic
Color: grey

Size	Version	Catalog Number	Reference Number	Packing
D02	E 18 without test hole	01715.000000	L206435	20
D02	E 18 with testing hole	01715.000200	P211981	20

for NEOZED D01 fuses with reduction spacer

Size	Version	Catalog Number	Reference Number	Packing
D02	E18 with testing hole	01715.890200	M214026	20
DII	E 27 with testing hole	02071.000000	L201720	20
DIII	E 33 with testing hole	02072.000000	E214019	20



Cover trips for individual busbars
Max. bar width 30 mm, PVC
Color:
RAL 7035 – light grey

Size	Version	Catalog Number	Reference Number	Packing
	for 5 mm busbars	08356.050000	V218173	1
	for 10 mm busbars	08356.010000	X216128	1



Grip-lug cover
for NH fuse-links, fits NH bases, with touch guard

for 1 required for 1 fuse link

Size	Version	Catalog Number	Reference Number	Packing
00		08350.900000	G222186	30

for 2 required for 1 fuse link

Size	Version	Catalog Number	Reference Number	Packing
1		08351.900000	C222941	30

Universal Support TRI60

General information

Classification	Busbar sytem with 60 mm phase bar clearance
Spefications	DIN VDE 0660 Part 500, EN 60439-2, IEC 439-2
Number of poles	3-, 4- or 5-polig
Rated uninterrupted current I_n	630 A
Rated duty	Continuous duty
Rated current strength	100 kA
Rated short-time current strength	28.5 kA (1 sec.)
Rated operational voltage U_e	Max. ~ 660 (~ 690) V
Rated frequency	45 – 62 Hz
Permissible ambient temperature	– 25 bis + 55 °C
Storage temperature	– 40 bis + 80 °C
Size of copper bars	12 x 5 mm to 30 x 10 mm
Degree of protection	IP 3 x under central covers
	IP 2 x with compartmentalized system

Technical specifications on TRI 60 components

Classification	Busbar support to DIN VDE 0660, Part 500
Specifications	DIN VDE 0660 Part 500
Sizes	3-pole, 1-pole for PE/N
Bar dimensions	from 12 x 5 mm to 30 x 10 mm
Bar centerline clearance	60 mm
Electrodynamic strength	
Conditional short-circuit	up to 100 kA with back-up fuse gL-gG
Short-time current strength	28,5 kA (1 sec.)
Material	high-temperature resistance, self-extinguishing plastic
Flame retardance	to DIN VDE 0471 Part 1 up to 960 °C
Maximum tightening torques of connection screws	5 Nm

TRI 60 labelling system

Classification	DUOMAT self-adhesive labels
Material	DUOMAT two-layer material
Support sheet size	DIN A4
Adhesive setting time	24 h

Universal Support — TRI60

TRI 60 bus-mounting fuse-base

Classification	Fuse-base to DIN VDE 0636
Specifications	DIN VDE 0636 Part 1, 10, 31, 41, 301, IEC 60269-3
Sizes	D02 (NEOZED), DII, DIII
Number of poles	3-pole
Rated current I_n	2 – 63 A
Rated voltage U_n	~ 400 V, ~ 500 V, ~ 660 V, ~ 690 V
Rated frequency	45 – 62 Hz
Rated insulation voltage U_i	2500 V
Permissible ambient temperature	> – 5 °C
Storage temperature	Max. 150 °C
Attachment types/cross-sections	DII: 10 mm^2 wire clamp connection recessed head screw DIII: 25 mm^2 wire clamp connection recessed head screw with covering : safe from finger touch to accident norm VBG 4
Position of normal use	Any
Degree of protection	IP 20
Attachment method	Latching on to TRI 60 busbar system
Contacting	Direct low-loss to surface-treated E-Cu bar

TRI 60 compartmentalized system

Classification	Shock-hazard protection to UVV-VBG 4
Shock-hazard protection	Protection from front (VBG 4) and extending behind
Degree of protection	IP 20
Materials	Flame-retardant, halogen and CFC-free plastics
Flame retardance	As per DIN VDE 0471 Part 2, 650 °C

TRI 60 equipment adapter

Classification	Equipment adapter for panal components to DIN 43880
Rated current	32 A, 63 A
Width	54 mm, 72 mm, 81 mm
Mounting rail	to DIN EN 50022 plastic
Conductor	AWG 10 = 6 mm^2, AWG 8 = 10 mm^2
Resistance to heat	105 °C
Size of wire-end ferrule	32 A: 2,9 x 2,9 mm 63 A: 4,1 x 4,1 mm

Universal Support TRI60

TRI 60 LV HRC (NH) bus-mounting fuse switch-disconnector

Classification	LV HRC fuse switch-disconnector to DIN VDE 0660 Part 107	
Specifications	DIN VDE 0660 Part 107, EN 60947-3, IEC 947-3 (IEC 408)	
Sizes	Size 00	Size 1
Number of poles	3-pole	3-pole
Rated uninterrupted current I_n with fuse-links to DIN VDE 0636 and DIN 43620 gG	160 A	250 A
Rated duty	Continuous duty	Continuous duty
Rated operational voltage U_e	~ 660 (~ 690) V	~ 660 (~ 690) V
Rated frequency	45 – 62 Hz	45 – 62 Hz
Rated insulation voltage U_i	1000 V	1000 V
Insulation group to DIN VDE 0110	C	C
Rated short-time breaking capacity I_{cm} (1 sec. with connecting blades)	3 kA	10 kA
Rated short-circuit Making capacity	50 kA	50 kA
with fuses (at ~ 500 V and rapid making)	Size 00/160 A	Size 1/250 A
Rated breaking capacity		
Rated service current I_e at		
AC 23B / 400 V cos φ = 0.35	128 A	200 A
AC 22B / 500 V cos φ = 0.65	160 A	250 A
AC 21B / 660 V cos φ = 0.95	80 A	125 A
DC 22B / - 400 V t = 15 ms	100 A	-----
Storage temperature	– 40 to + 80 °C	– 40 to + 80 °C
Mechanical service life (switchings)	1000	1000
Loss of contact decks P_v	6 W	17 W
Max. power loss (of fuse-links)	12 W	23 W
Attachment types/cross-sections and maximum admissible tightening torques		
Screw at outgoing terminal	M8 / 15 Nm	M10 / 38 Nm
Clip at outgoing terminal	4 –70 mm²/ 3 Nm	6 – 150 mm²
Max. sizes for flexible copper busbars	9 x 6 mm	15 x 9 mm
Max. width for copper bars	20 mm	30 mm
Tightening torque	7 Nm	15 Nm (Adapter)
Position for normal use	Any	Any
Degree of protection	IP 30	IP 00

Universal Support TRI60

TRI 60 LV HRC (NH) busbar mounting fuse unit

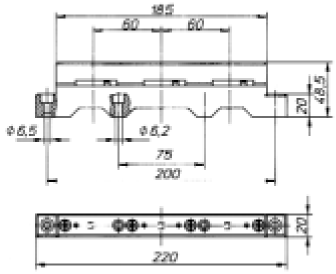
Classification	LV HRC fuse-base to DIN VDE 0636 Part 21		
Specifications	DIN VDE 0636 Part 21, IEC 269-2, DIN 43620		
Sizes	**Size 00**	**Size 1**	**Size 3**
Number of poles	3-pole	3-pole	3-pole
Outgoing to	Top	Bottom	Bottom
Rated uninterrupted current I_u with fuse-links to DIN VDE 0636 and DIN 43620	160 A	250 A	400 A
Rated duty	Cont. duty	Cont. duty	Cont. duty
Rated operational voltage U_e	~ 660 (~ 690) V	~ 660 (~690) V	~660(~690)V
Rated frequency	45 – 62 Hz	45 – 62 Hz	45 – 62 Hz
Storage temperature	– 40 bis +80 °C	– 40 bis +80 °C	– 40 bis +80 °C
Attachment types/cross-sections and maximum tightening torques			
Screw at outgoing terminal	M8 / 15 Nm	M10 / 38 Nm	M10 / 38 Nm
Clip at outgoing terminal	4 – 70 mm² / 3 Nm		
Tightening torque, claw-type fixing terminal	6 Nm	20 Nm	20 Nm
Degree of protection	IP 20	IP 00	IP 00

TRI 60 connection system

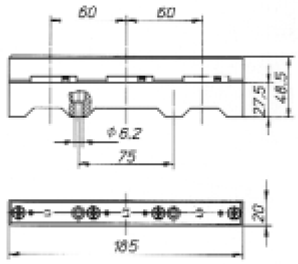
Classification	Busbar-terminals DIN VDE 0609 Part 1		
Specifications	DIN VDE 0609 Part 1, EN 60999, IEC 999		
Capacity of terminals	1,5 – 16 mm²	1,5 – 35 mm²	16 – 120 mm²
Possible bar heights	5 or 10 mm	5 or 10 mm	5 or 10 mm
Schraubenart	± Schraube M5	M8 6-kant	M10 6-kant
Permissible tightening torque	4 Nm	8 Nm	20 Nm
Heating of terminals	<< 45 K	<< 45 K	<< 45 K

Universal Support TRI60

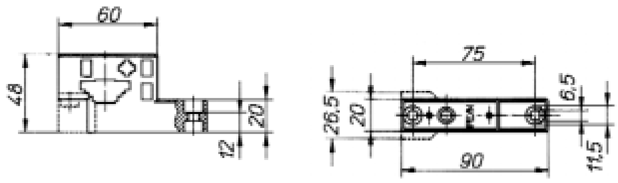
Busbar supports



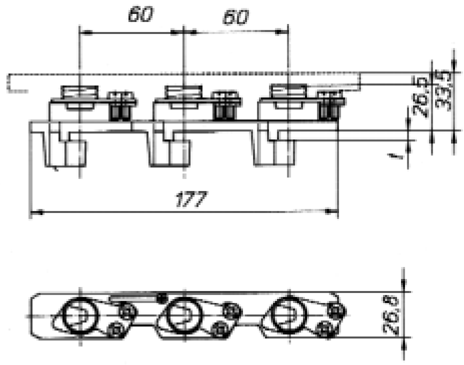
Universal busbar support, three-pole
with additional mounting holes outside



Universal busbar support, three-pole
with inside mounting holes

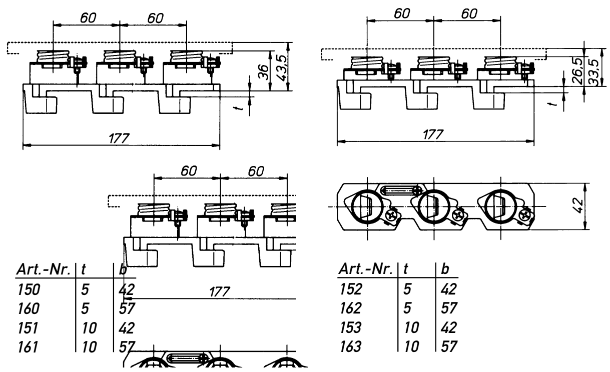


N/PE busbar support



Art.-Nr.	t
1750	5/10
1751	10

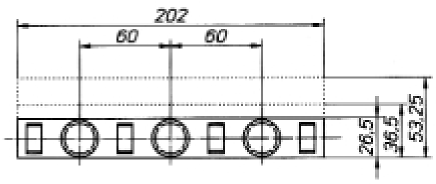
NEOZED bus-mounting fuse base, three-pole,
for 60 mm busbar systems



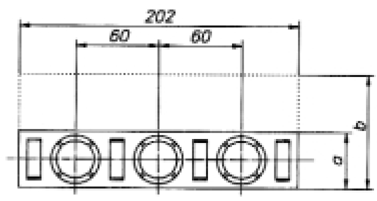
Art.-Nr.	t	b
150	5	42
160	5	57
151	10	42
161	10	57

Art.-Nr.	t	b
152	5	42
162	5	57
153	10	42
163	10	57

D-type bus-mounting fuse-base, three-pole
for 60 mm busbar systems

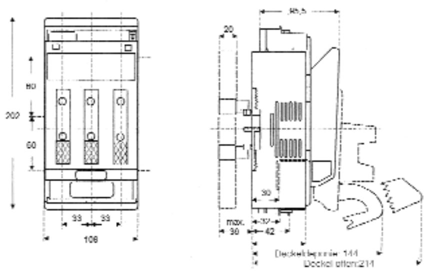


Cover for NEOZED fuse base, three-pole



Art.-Nr.	a	b
155	41,75	
157		83,75
165	56,75	
167		113,75

Covers for D-type fuse base, 3-pole

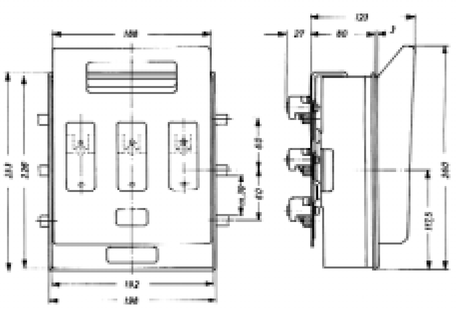


LV HRC (NH) fuse switch-disconnector size 00
for disc attachment to busbar

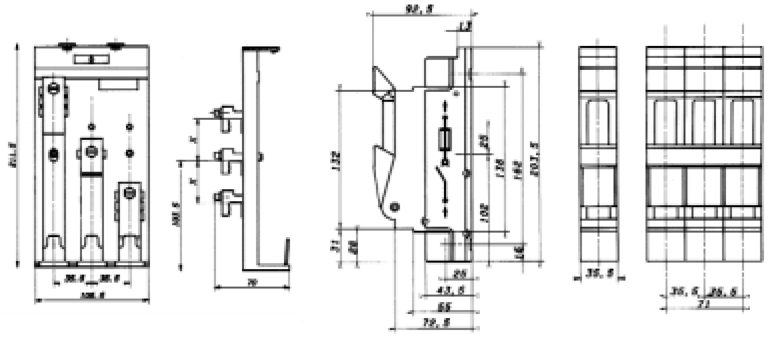
Ferraz Shawmut

Universal Support TRI60

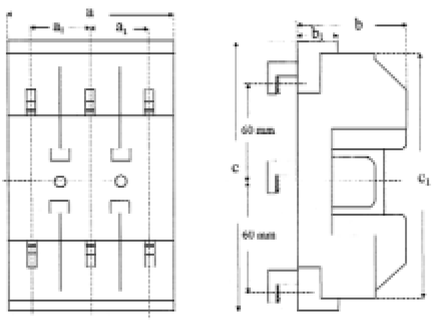
Busbar supports



LV HRC (NH) fuse switch-disconnector size 1

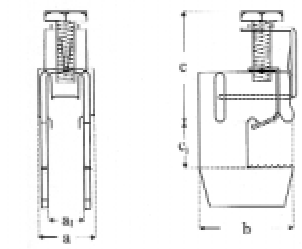


Adapter suitable for NH 00 LINOCUR



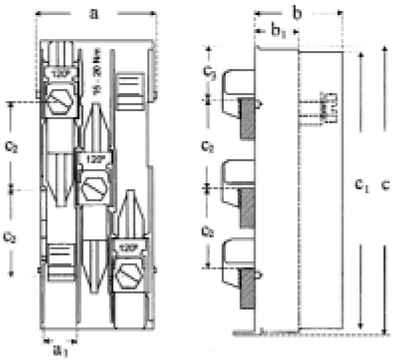
Art.-Nr.	a	a_1	b	b_1	c	c_1
8350	99	33	89	32	202	195
8350.2	99	33	89	32	202	195
8351	195	65	110		200	
8351	195	65	110		200	

NH bus-mounting fuse base, 3-pole



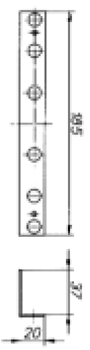
Art.-Nr.	a	a_1	b	c	c_1
1760.01016	13,5	7,5	24	28	10
1760.01035	18	10,8	28,5	38	10
1760.01070	20	14	30	42	10
1760.01120	25,5	17	36	55	10
1760.05016	13,5	7,5	24	28	5
1760.05070	20	14	300	42	5
1760.05035	18	10,8	28,5	38	5
1760.05120	25,5	17	36	55	5

Universal-Anschlußklemmen

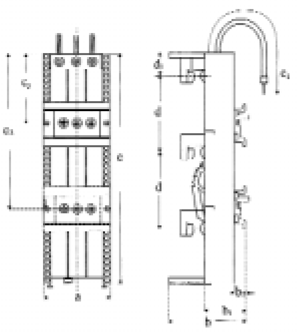


Art.-Nr.	a	a_1	b	b_1	c	c_1	c_2	c_3
8355.01	84	21	59	32	200	195	60	35
8355.05	84	21	59	32	200	195	60	35
8358	84		59	32	202	195		35

Terminal plate, 3-pole

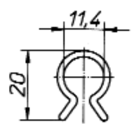


Insulating side cover with screws



Art.-Nr.	a	a_1	b_1	b_2	c	c_1	c_2	c_3	d	d_1
3800.211	54	60	32	8,5	182	120	88		60	20
3800.221	54	60	32	8,5	182	120	143	48	60	20
3800.311	54	60	32	8,5	182	120	88		60	20
3800.312	72	60	32	8,5	182	120	88		60	20
3800.313	81	60	32	8,5	182	120	88		60	20
3801.021	54	60	32	8,5	182		143	48	60	20

Adapter without wire-connection



Distance clip, 9 mm

Wiring bar program

Wiring bars

Fork design

Wiring bars in fork-type design are ideal for the wiring of modular panel-mounting devices as per DIN 43880 with flat-type, dual-function or single-screw terminals.

Additional incoming terminals are required when wiring devices with flat-type or single-screw terminals.

In contrast, devices with dual-function terminals allow bar connection to the top section of the terminal with simultaneous incoming supply in the bottom section.

The use of end caps on multi-pole wiring bars guarantees optimum shock-hazard protection and prevents arcing at bar ends.

Pin design

Wiring bars in pin design are ideal for the wiring of modular panel-mounting devices to DIN 43880 with box terminal, frame terminal or two-screw clamp.

The incoming supply to the wiring-bar system is provided over additional incoming terminals.

The wiring bar maximum current-carrying capacity is obtained by providing the incoming supply at the center of the bars.

Universal Support

WIRING BARS

Technical data

	One-phase wiring					
Cross-section of bar	10 mm²	12 mm²	16 mm²	20 mm²	24 mm²	36 mm²
Max. bar current I_S/Phase A	50 A	55 A	65 A	75 A	85 A	110 A
Max. input current I_S/Phase in A	100 A	110 A	130 A	150 A	170 A	220 A
at centric input						

	Mehrphasenverdrahtung	
Schienenquerschnitt	10 mm²	16 mm²
max. Schienenstrom	50 A	65 A
max. Einspeisestrom	100 A	130 A
at centric input		

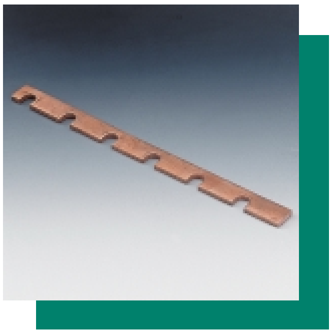
Rated voltage:	400 V
High voltage strength:	up to 3 kV
Short-circuit strength:	up to 25 kA at 100 A back-up fuse
Vorschriften:	VDE 0606/9.77
Material of bars:	copper SF-Cu
Material of insulating section:	high temperature resistance
	low flammability
	self-extinguishing
	halogen-free

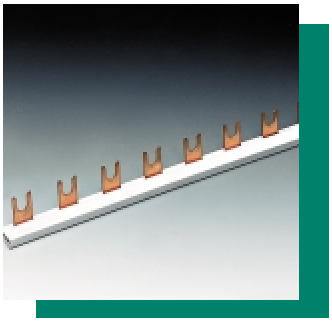
Universal Support

WIRING BARS

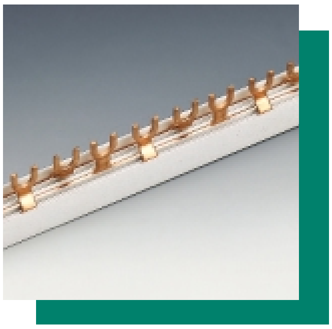
Fork design

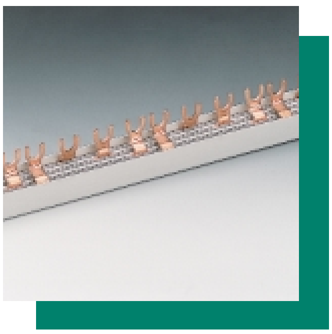
Wiring bars











Number of poles	Division ratio in mm	Cross section in mm²	Length in mm	Circuits	Catalog Number	Reference Number	Packing
1	9	10	1000	57	01790.000000	W207387	100
1	9	24	1000	57	01790.240000	W211527	50
1	17,8	12	210	12	02955.000000	F218689	100
1	17,8	12	1000	57	02956.000000	T219207	50
1	27	36	1000	36	01791.000000	H213033	50
1	17,8	12	210	12	02960.120000	Z222938	50
1	17,8	12	1000	57	02959.120000	W219738	50
1	17,8	20	1000	57	02959.200000	D222183	50
1	27	16	1000	36	01792.160000	B212038	50
1	27	24	1000	36	01792.240000	T212560	50
2	17,8	16	1000	28	02948.160000	M215613	20
2	27	16	1000	19	02949.160000	V216126	5
3	17,8	10	210	4	02950.000000[1]	S216630[1]	25
3	17,8	10	1000	19	02951.000000[1]	J217657[1]	20
3	17,8	16	210	4	02950.000000[1]	S216630[1]	25
3	17,8	16	1000	19	02951.000000[1]	J217657[1]	20
3	17,8	16	210	1/3	02946.000000[1][2]	F214595[1][2]	25
3	27	16	1000	12	01797.160000[1]	Z213577[1]	20
3	27	16	1000	12	01795.160000	E213076	20
4	17,8	16	1000	14	02947.160000	L215106	15

[1] Forks in centric position

[2] für einen 4- pol. FI-Schutzschalter und acht 1 -pol. LS-Schalter (N-Pol ausgespart)

Universal Support

WIRING BARS

Utilization / Connection terminals

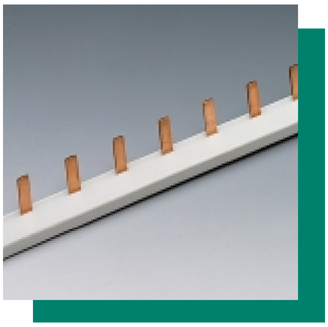
Utilization	LINOCUR D01	LINOCUR D02	NFC7FD-base with screw term.	Plastic base LINOZED		End cap Ref. Number	V219208	B213533	G218690	T218172
W207387	●		●			–	●	●		
W211527	●		●			–	●	●		
F218689	●					–	●	●		
T219207	●					–	●	●		
H213033			●			–	●	●		
						–	●	●		
Z222938						–				
W219738						–				
B212038		●		●		–				
T212560		●		●		–				
						–				
						–				
M215613	●					1796	●		●	
V216126		●				2965				
						incl.				
						2952				
						incl.				
						1796				
						incl.				
Z213577	●		●			1796				
E213076		●				1796	●		●	
L215106					●	2954				

Universal Support

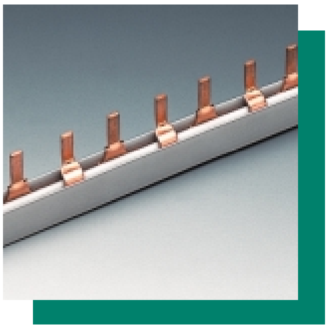
WIRING BARS

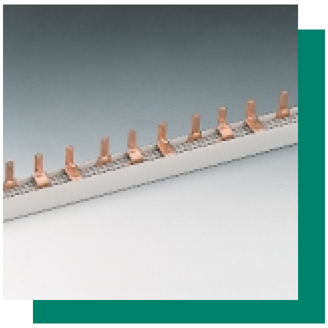
Pin design

Wiring bars

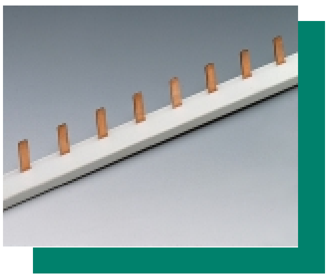


Number of poles	Division ratio in mm	Cross section in mm²	Length in mm	Circuits	Catalog Number	Reference Number	Packing
1	17,8	10	1000	57	02961.000000	H200728	20
1	17,8	16	1000	57	02961.160000	X207388	20
1	27	16	1000	37	02963.000000	M215107	50
2	17,8	10	1000	28	02961.002000	X201270	20
2	17,8	16	1000	28	02961.162000	C212039	20
3	17,8	10	210	4	02964.000000	W216127	25
3	17,8	10	1000	19	02961.003000	G201785	20
3	17,8	16	210	4	02964.160000	T216631	25
3	17,8	16	1000	19	02961.163000	A213578	20
3	27	16	1000	12	02963.003000	N215614	20





End cap



Description	Circuits	Catalog Number	Reference Number	Packing
16 mm² 2 u. 3-pol.		01796.000000	E222184	10
10 mm² 3-pol.		02952.000000	A222939	10
10 mm² 2-pol.		02953.000000	J200729	10
16 mm² 4-pol.		02954.000000	Y201271	10
for V216126		02965.000000	H201786	10

Universal Support

WIRING BARS

Utilization

	NEOZED base with twin-screw term.	NEOKIT
H200728		●
X207388		●
M215107	●	
X201270		●
C212039		●
W216127		●
G201785		●
T216631		●
A213578		●
N215614	●	

Connection terminals

End cap article no.	2991	2976	2977
–	●		
	●		
–	●	●	
2953	●		●
1796	●		●
incl.	●		●
2952	●		●
incl.	●		●
1796	●		●
1796	●	●	

Universal Support

Pin design

WIRING BARS



2990

Connection terminals for input
Fork design

Max. terminal cross section in mm²	Insulated yes/no	Version short/long	Catalog Number	Reference Number	Packing
25	yes	short	02990.000000	V219208	30
35	no	short	02972.000000	B213533	50
35	yes	long	02979.000000	G218690	35



2972



2979



2991

Connection terminals for input
Pin design

Max. terminal cross section in mm²	Insulated yes/no	Version short/long	Catalog Number	Reference Number	Packing
25	yes	short	02991.000000	X219739	30
35	no	short	02976.000000	F217148	50
35	no	long	02977.000000	K217658	50



2976



2977



2978

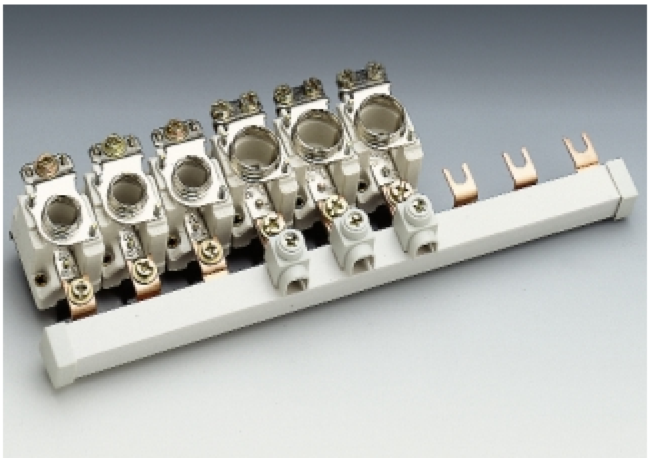
Universal terminal
Steg-/Fork design

Max. terminal cross section in mm²	Insulated yes/no	Version short/long	Catalog Number	Reference Number	Packing
35	yes	*	02978.000000	T218172	10

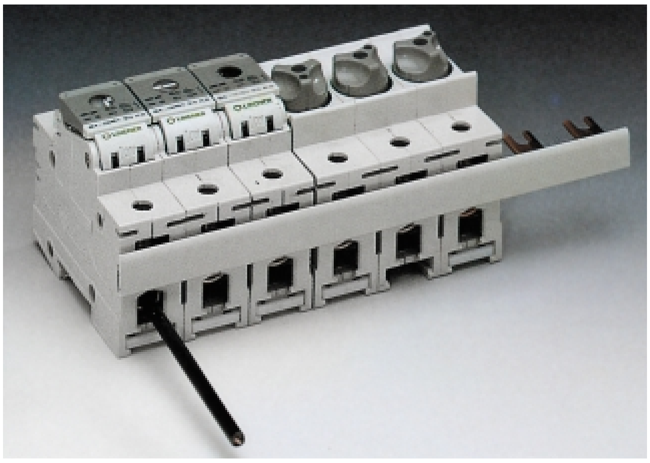
* Terminal must be put on wiring bar superately

Universal Support

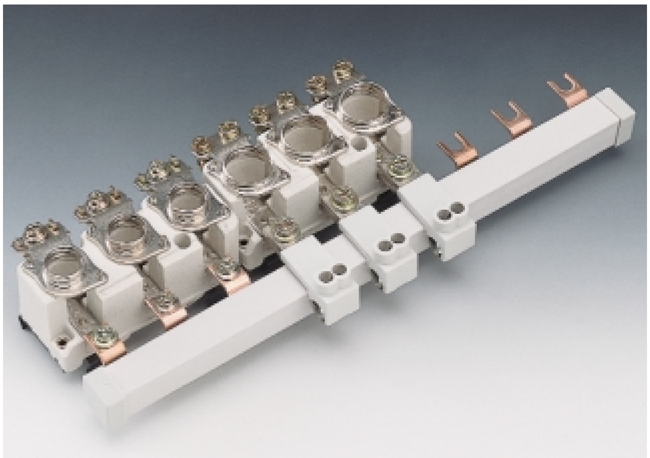
WIRING BARS



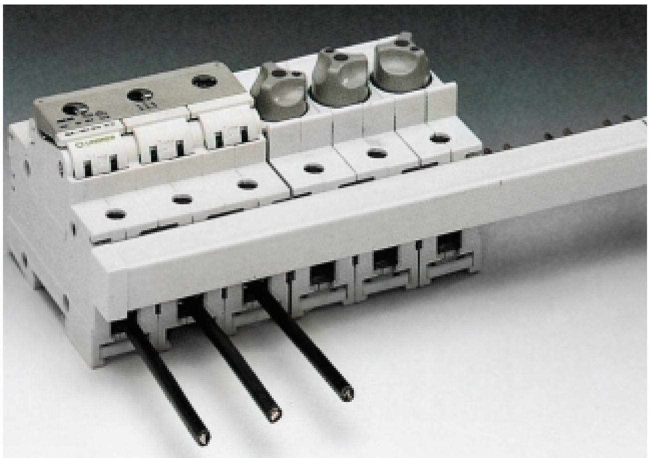
NEOZED base D01 and D02
3-pole wiring with 1795.16
Connection terminals 2990



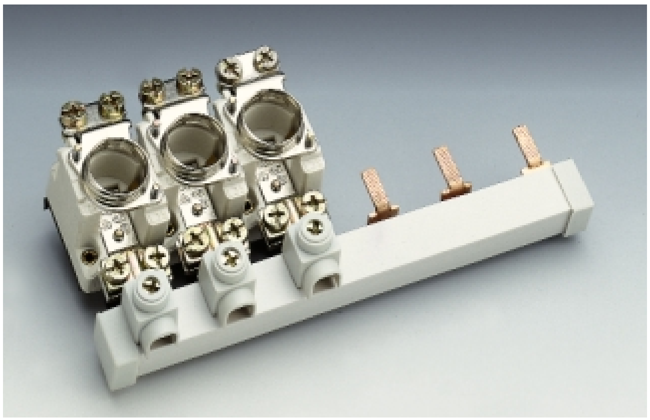
LINOZED-LINOCUR D02
1-pole wiring with 1792.16



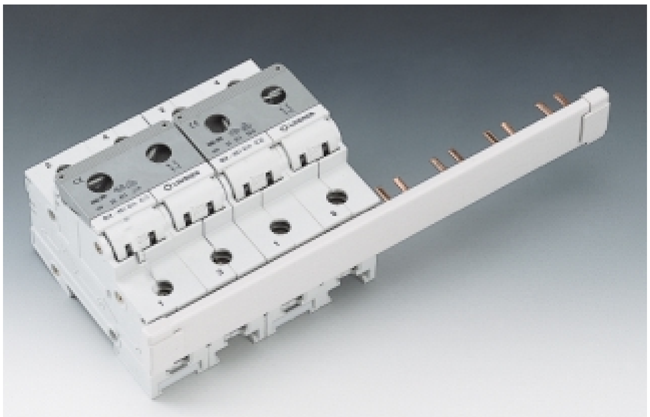
NEOZED base D01 and D02
3-pole wiring with 1795.16
Connection terminals 2979



LINOZED-LINOCUR D02
3-pole wiring with 1797.16



NEOZED base D02
with twin-screw terminal below
3-pole wiring with 2963.003
Connection terminals 2991



LINOCUR D02
2-pole wiring with 2949.16

In-Line Fuse Holders GEB



GEB IN-LINE BREAKAWAY FUSE HOLDERS

Ferraz Shawmut GEB In-Line Fuse Holders are designed to be attached to solid or stranded copper or aluminum wire. They accommodate 1-1/2" x 13/32" Midget and Class CC fuses and incorporate a patented built-in breakaway feature which isolates the load should the wire be accidentally tugged. Insulator material is polycarbonate. Three internal O-rings seal the GEB to provide a water-resistant compartment for the fuse. For further GEB protection, cone-shaped rubber boots (B307 or B309) can be slipped on and taped to insulate live parts and provide a UL recognized watertight seal.

Ratings

- ✔ 600VAC: 30A
- ✔ Withstand rating 200kA

Approvals

- ✔ UL Recognized Component
Guide IZLT2, File E52283
- ✔ CSA Certified
Class 6225, File 32169

RECOMMENDED FUSE USAGE

GEB Fuse Holders will accommodate these Ferraz Shawmut fuses:

Midget (1-1/2" x 13/32")**:** ATQ, ATM, TRM, OTM, GGU, GFN, A13X-2, A25Z-2, A60Q-2, A6Y-2B
Class CC: ATDR, ATMR, ATQR

In-Line Fuse Holders — GEB

Catalog Numbering System

Family	Load Terminal		Line Terminal		Optional
	Type	Material	Type	Material	Boots
GEB -	1	1 -	1	1	- B

KEY

Family: GEB -

Load or Line Terminal Type (and conductor no., size, range):

1 - Crimp: (1) #8 - #12 Sol/Str Cu or
(2) #12 - #14 Sol/Str Cu

2 - Crimp: (2) #10 Sol/Str Cu or
(1) #6 Sol/Str Cu or
(1) #4 Sol Cu

3 - Crimp: (2) #10 Sol/Str Cu or
(1) #4 Str Cu

4 - Crimp: (2) #6 Sol/Str Cu or
(1) #2 Str Cu

8 - Set screw: (1) #2 - #12 Sol/Str Cu

9 - Double set screw: (1) #2 - #12 Sol/Str Cu per opening

Terminal Material:

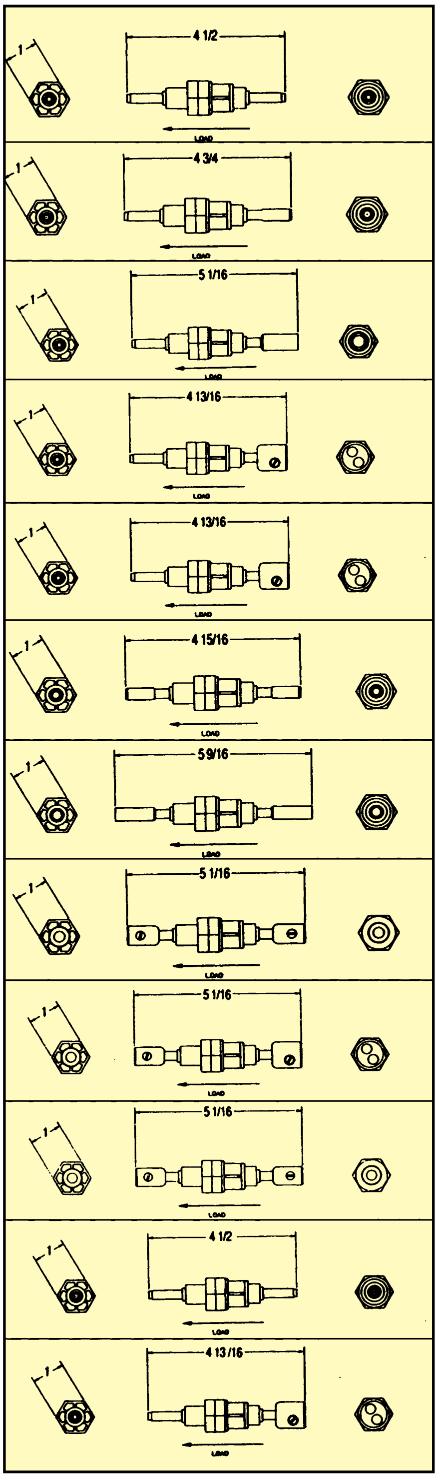
1 - Copper

2 - Aluminum

Optional Boots:

- B Two appropriate rubber boots included in package

GEB-11-11
GEB-11-21
GEB-11-41
GEB-11-91
GEB-11-92
GEB-21-21
GEB-31-31
GEB-81-81
GEB-81-91
GEB-82-82
GEBN-11-11
GEBN-11-91



CRIMPING TOOLS REFERENCE CHART

Note: The following crimping tools (or equivalent) are recommended.

Terminal Type	Burndy	T&B
1	Y14MV	WT-111M
2	MR4C, Hypress Y34A-Die #N50	TBM2/TBM5 Blue Die, WT-115-A Die 0
3	Hypress Y34-Die #N50	TBM2/TBM5 Grey Die, WT-115A Die E
4	Hypress Y34A-Die #N100	TBM5/TBM8 Brown Die, WT-115A Die F

In-Line Fuse Holders GEB

GEB In-Line Fuse Holder Family – Typical Combination Chart

	LOAD					LINE				
	CONDUCTOR SIZE	NO. PER TERMINAL	TERMINAL TYPE	SOLID	STRANDED	CONDUCTOR SIZE	NO. PER TERMINAL	TERMINAL TYPE	SOLID	STRANDED
GEB-11-11	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes
GEB-11-21	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#10 #6 #4	2 1 1	Cu Crimp Cu Crimp Cu Crimp	yes yes yes	yes yes no
GEB-11-41	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#6 #2	2 1	Cu Crimp Cu Crimp	yes no	yes yes
GEB-11-91	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#2-#12 (each)	1	Cu Double Set Screw	yes	yes
GEB-11-92	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#2-#12 (each)	1	Al Double Set Screw	yes	yes
GEB-21-21	#10 #6 #4	2 1 1	Cu Crimp Cu Crimp Cu Crimp	yes yes yes	yes yes no	#10 #6 #4	2 1 1	Cu Crimp Cu Crimp Cu Crimp	yes yes yes	yes yes no
GEB-31-31	#10 #4	2 1	Cu Crimp Cu Crimp	yes no	yes yes	#10 #4	2 1	Cu Crimp Cu Crimp	yes no	yes yes
GEB-81-81	#2-#12	1	Cu Set Screw	yes	yes	#2-#12	1	Cu Set Screw	yes	yes
GEB-81-91	#2-#12	1	Cu Set Screw	yes	yes	#2-#12 (each)	1	Cu Double Set Screw	yes	yes
GEB-82-82	#2-#12	1	Al Set Screw	yes	yes	#2-#12	1	Al Set Screw	yes	yes
GEBN-11-11	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes
GEBN-11-91	#8-#12 #12-#14	1 2	Cu Crimp Cu Crimp	yes yes	yes yes	#2-#12 (each)	1	Cu Double Set Screw	yes yes	yes yes

Notes:
1. GEBN versions have a permanently mounted dummy fuse for neutral applications.
2. Two B307 boots are recommended for each GEB (for double set screw terminals one B307 boot and one B309 boot are required). Boots can be cut at appropriate rib to fit outside diameter of conductor insulation.
3. Other configurations available -ask sales representative.

Fuse holders — PRF

PORTE-FUSIBLES MINIATURES
MINIATURE FUSE HOLDER

Montage en ligne ou en faisceau.
In-line mounting.

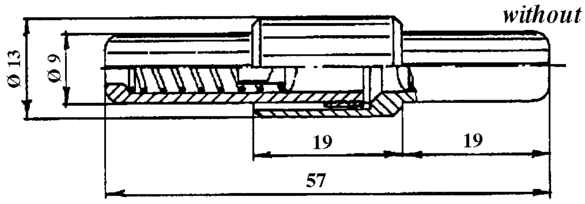
250 V ~ 6,3A

PORTE-FUSIBLE 5 x 20
FUSE-HOLDER 5 x 20

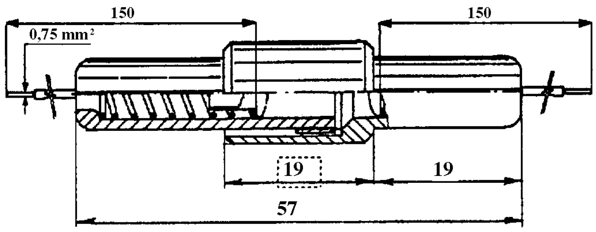
PRF 5-6 SF - PRF 5-6 AF

Dimensions
Dimensions

M 205 010 PRF 5-6 SF sans cable
without cable



W 078 311 : PRF 5-6 AF avec câble / *with cable*





Poids maximum : PRF 5-6 SF : 5 g
(Max weight) PRF 5-6 AF : 8 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

•Caractéristiques électriques :
- Tension assignée : 250 V.
- Puissance dissipée : 1,6 W à 40° C.
- Courant assigné approuvé : 6,3 A.
- Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
- Résistance de contact : < 5 mΩ.
- Résistance d'isolement : > 100 MΩ.

•Montage : à insérer sur une ligne électrique.

•Raccordements : PRF 5-6 SF rivets à sertir. PRF 5-6 AF Câble de section 0,75 mm².

•Matières :
- **Porte-fusibles :** Thermoplastique noir (PA 6).
- **Câbles :** en cuivre avec une gaine PVC noire.
- **Contacts :** Alliage de cuivre.

•Catégorie contre les chocs électriques : PC1 suivant la norme CEI 127-6.

•Conditionnement :

	PRF 5-6 SF	PRF 5-6 AF
Par 1 000 pièces :	M 205 010 T	W 078 311 T
Par 10 pièces :	M 205 010 J	W 078 311 J

•Electrical characteristics:
- Rated voltage: 250 V.
- Power dissipation: 1,6 W à 40° C.
- Rated current: 6,3 A.
- Dielectric Strength: > 3 KV, 50 Hz, 1 min. dry.
- Contact resistance: < 5 mΩ.
- Insulation resistance : > 100 MΩ.

•Mounting: In-line fuseholders.

•Connections: PRF 5-6 SF crimp rivet printed. PRF 5-6 AF Cable 0,75 mm².

•Material:
- **Holder:** Thermoplastics (PA 6).
- **Cable:** copper with black PVC sheath.
- **Contacts:** Copper alloy.

•Shock Safety: PC1 (IEC standard 127-6).

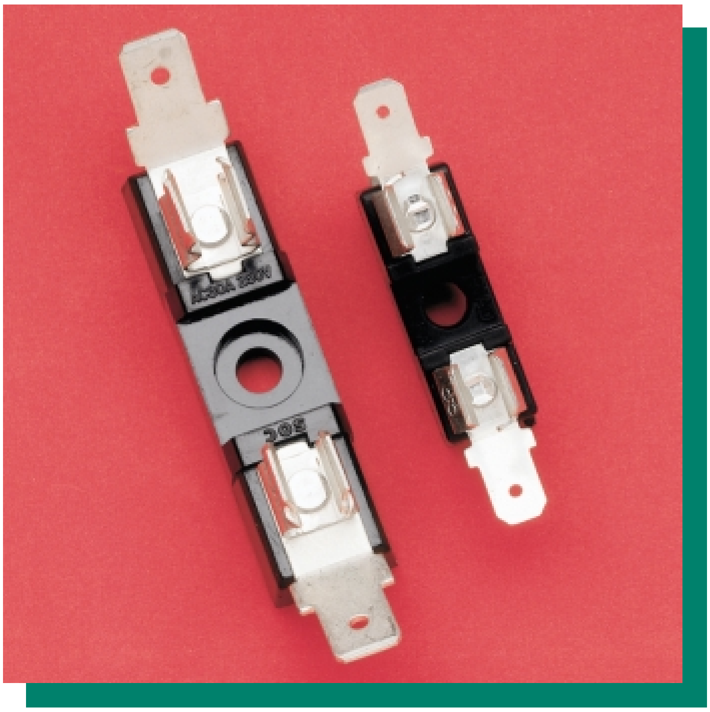
•Packaging:

	PRF 5-6 SF	PRF 5-6 AF
Per 1,000 pieces:	M 205 010 T	W 078 311 T
Per 10 pieces:	M 205 010 J	W 078 311 J

Miniature Fuses

Bases

5x20QC1, 6x32QC1



RECOMMENDED FUSE USAGE

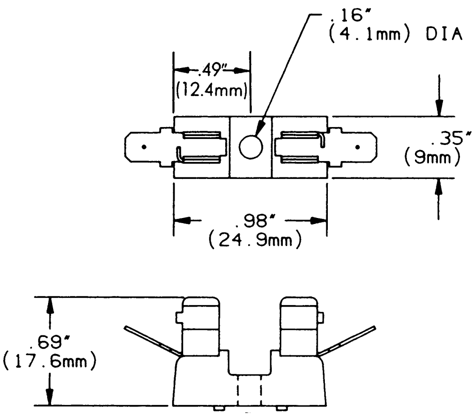
5X20QC1 . . . . .use with **GGM, GGA, GSA, GSB, GDG**

6X32QC1 . . . . .use with **GSA, GDL, GGC, GAB**

5X20QC1

SINGLE-POLE FUSE BLOCK for 5mm x 20mm fuses

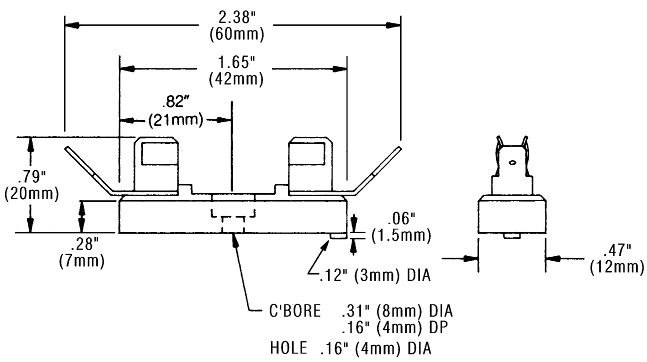
- ✔ Tin plated clips
- ✔ Polyester insulator
- ✔ 3/16” quick-connect terminals
- ✔ Rated 15A, 250V
- ✔ UL Recognized



6X32QC1

SINGLE-POLE FUSE BLOCK for 1/4” x 1-1/4” fuses

- ✔ Tin-plated phosphor bronze clips
- ✔ Phenolic insulator
- ✔ 1/4” quick-connect terminals
- ✔ Rated 30A, 250V - UL Recognized
- ✔ Rated 20A, 250V - CSA Certified



Ferraz Shawmut

Modular Bases

6x32



A low profile fuse block featuring individual barriers which reinforce the fuse clips while providing greater protection against clip damage and electrical shock. The unique design permits self-alignment of clips to fuse cap. This, plus a one-piece clip/terminal assures low contact resistance. Higher current ratings have been attained using spring brass clips. With the exception of the two-pole unit, multiple pole units may be broken apart to obtain desired number of poles.

Specifications

Dielectric Strength: 1500V., Minimum.
Clip/Terminals: Tin-Plated Spring Brass.
Base: Glass reinforced Thermoplastic. (Gray except Anti-Rotation series which is Black). UL 94V0 flammability rating. **Ambient Temperature:** -40ºC to +85ºC.

Approvals

Recognized under the Components Program of Underwrtiters Laboratories and Certified by CSA up to 300V and at current ratings shown below.

SERIES	CURRENT RATING U.L.	CSA
6X32000	30A	30A
6X32600	20A	20A
6X32800	20A	20A
6X32900	30A	25A
6X32101	15A	15A

Electrical Specifications

SERIES	CURRENT RATING U.L.	CSA
6x32000	30A	30A
6x32600	20A	20A
6x32800	20A	20A
6x32900	30A	25A
6x32101	15A	15A

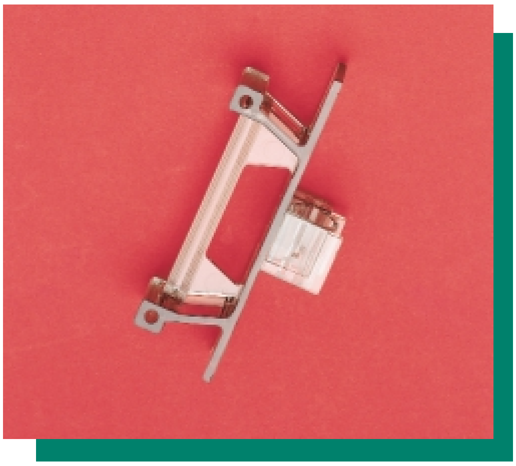
Ordering Information:

CATALOG NUMBER				REFERENCE NUMBER				NUMBER OF POLES	REFERENCE DIMENSION "A"
SOLDER TYPE TERMINALS	NEMA STYLE 3/16" QC TERMINALS	1/4" QC TERMINALS	NEMA STYLE 1/4" QC TERMINALS	SOLDER TYPE TERMINALS	NEMA STYLE 3/16" QC TERMINALS	1/4" QC TERMINALS	NEMA STYLE 1/4" QC TERMINALS		
6X32001	6X32601	6X32801	6X32901	L225732	B225746	Q225759	E225772	1	.50"
6X32002	6X32602	6X32802	6X32902	M225733	C225747	R225760	F225773	2	1.12"
6X32003	6X32603	6X32803	6X32903	N225734	D225748	S225761	G225774	3	1.75"
6X32004	6X32604	6X32804	6X32904	P225735	E225749	T225762	H225775	4	2.38"
6X32005	6X32605	6X32805	6X32905	Q225736	F225750	V225763	J225776	5	3.00"
6X32006	6X32606	6X32806	6X32906	R225737	G225751	W225764	K225777	6	3.63"
6X32007	6X32607	6X32807	6X32907	S225738	H225752	X225765	L225778	7	4.25"
6X32008	6X32608	6X32808	6X32908	T225739	J225753	Y225766	M225779	8	4.88"
6X32009	6X32609	6X32809	6X32909	V225740	K225754	Z225767	N225780	9	5.50"
6X32010	6X32610	6X32810	6X32910	W225741	L225755	A225768	P225781	10	6.13"
6X32011	6X32611	6X32811	6X32911	X225742	M225756	B225769	Q225782	11	6.75"
6X32012	6X32612	6X32812	6X32912	Y225743	N225757	C225770	R225783	12	7.38"
6X32021*	6X32621*	6X32821	6X32921*	Z225744*	P225758*	D225771	S225784*	1	.50"
6X32101	-	-	-	A225745	-	-	-	1	.50"

* With anti-rotation boss

Accessories

DFC3M/DFC3LP/DRM



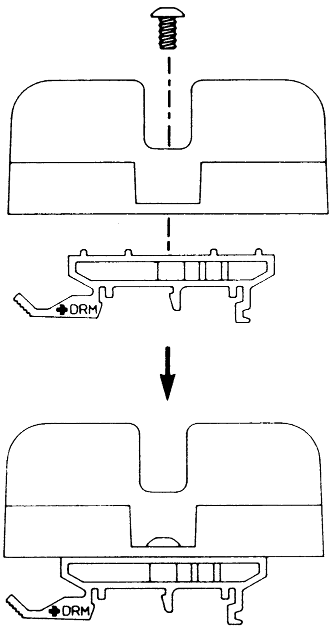
DFC3M SAFETY PULLER PROTECTS PERSONNEL, COVERS LIVE PARTS

The DFC3M Safety Puller is intended to hold and safely enclose 1-1/2” x 13/32” Midget or Class CC fuses for insertion or removal from fuse clips, making fuse installation easy and safe without the use of a standard fuse puller. The DFC3M is made of clear polycarbonate, so the fuse can be identified when installed in a 303 series fuse block.



DFC3LP SAFETY PULLER HOLDS FUSE, PROTECTS PERSONNEL AND SAVES SPACE

The DFC3LP holds and safely encloses 1-1/2” x 13/32” Midget or Class CC fuse, similar to the DFC3M, but with a lower profile in height so it takes less room where space is restricted. The DFC3LP is made of clear polycarbonate so the fuse can be seen after installation in a fuse block such as the Ferraz Shawmut 303 series.



DRM ADAPTS 303 SERIES MIDGET AND CLASS CC FUSE BLOCKS TO DIN RAIL

The DIN rail adapter, DRM, provides quick mounting for all Ferraz Shawmut 303 Series Midget and Class CC fuse blocks to all symmetrical 35mm DIN or asymmetrical 32mm “G” rail. A DRM adapter is attached to each pole with the screw provided. The DRM is molded of black polycarbonate and is mounted or dismounted from the rail simply by depressing the finger pull.

FUSE BASES SI PTF

250 V ~ 6,3 A

SUPPORT POUR FUSIBLES 5 x 20

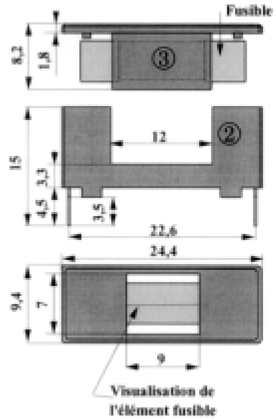
FUSE-BASE FOR 5 x 20 FUSES

SI PTF 76 - 78 ET CPT BS PTF 76/78

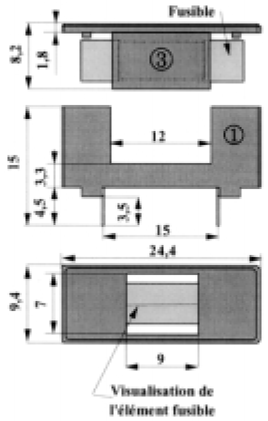
PORTE FUSIBLES MINIATURES
OPEN-TYPE FUSEHOLDER

Dimensions
Dimensions

K 208 228 + L 208 229



J 208 227 + L 208 229





en cours　　en cours

Poids maximum : Support (Base) : ① SI PTF 76 réf. : J 208 227 : 1,5 g – ② SI PTF 78 réf. : K 208 228 : 1,25 g
(Max weight) Capuchon (Hood) : ③ CPT BS 76/78 réf. : L 208 229 : 0,5 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

•Caractéristiques électriques :
- Tension assignée : 250V.
- Puissance dissipée : 1,6W à 40°C.
- Courant assigné approuvé : 6,3A.
- Tenue diélectrique : > 3KV, 50Hz, 1 min sèche.
- Résistance de contact : < 5 mΩ.
- Tenue aux tension d'impultion : > 6KV (1,2/50 µs).

•Montage : Picot à souder (conforme à la CEI 68-2-20).

•Matières :
- **Porte fusibles et capuchon :** Matière thermoplastiques verte (polyamide PA6,8) UL 94 V0.
- **Pièces métalliques :** Alliage de cuivre (CuZn37H30) protégées contre la corrosion (2µm Ni + 5µm Sn).

•Conditionnement :
- **Supports :** par 1 000 pièces : ① J 208 227 T – ② K 208 228 T, par 10 pièces : ① J 208 227 J – ② K 208 228 J.
- **Capuchon :** par 1 000 pièces : ③ L 208 229 T, par 10 pièces : L 208 229 J.

•Electrical characteristics:
- Rated voltage: 250V.
- Power dissipation: 1,6W à 40°C.
- Rated current approved : 6,3A.
- Dielectric Strength: > 3KV, 50Hz, 1 min dry.
- Contact resistance: < 5mΩ.
- Impulse withstand voltage: > 6KV (1,2/50µs).

•Mounting: Soldering pins (According. IEC 68-2-20).

•Material:
- **Holder and Hood:** Thermoplastic (polyamide PA6,8) UL 94 V0, Green.
- **Metal parts:** Copper Alloy (CuZn37H30) corrosion protected (2µm Ni + 5µm Sn).

•Packaging:
- **Base:** per 1,000 pieces: ① J 208 227 T – ② K 208 228 T, per 10 pieces: ① J 208 227 J – ② K 208 228 J.
- **Hood:** per 1,000 pieces: ③ L 208 229 T, per 10 pieces: L 208 229 J.

FUSE BASES

SI PTF

PORTE- FUSIBLES MINIATURES TYPE OUVERT
OPEN-TYPE FUSEHOLDER

250 V ~ 6,3A

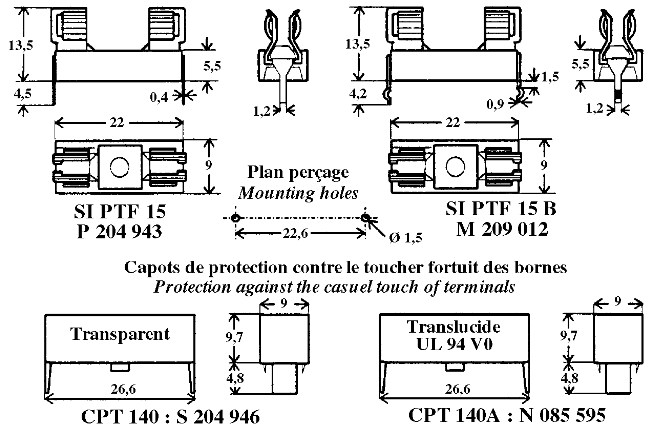
SUPPORTS POUR FUSIBLES 5 x 20

FUSE BASE FOR 5 x 20 FUSES

SI PTF 15 - 15B et CPT 140-140A

Montage sur circuit imprimé
Printed circuit board

Dimensions
Dimensions





Poids maximum : Support (Base) : 2 g
(Max weight) Capuchon (Hood) : 1,5 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

- **Caractéristiques électriques :**
  - Tension assignée : 250 V.
  - Puissance dissipée : 1,6 W à 40° C.
  - Courant assigné approuvé : 6,3A.
  - Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
  - Résistance de contact : < 5 mW.
  - Résistance d'isolement : > 100 MW.

- **Montage :** Picots à souder (soudabilité conforme à la CEI 68-2-20). Perçage C.I. : Ø 1,5 mm (voir dessin de perçage).

- **Matières :**
  - **Porte-fusibles :** Thermoplastique beige (PPOM) UL94 V1.
  - **Capuchons :** Thermoplastique transparent (CPT 140 SAM) (CPT 140A PC UL 94 V0).
  - **Pièces métalliques :** Alliage de cuivre (CuZn37H30) protégé contre la corrosion (Ni+Sn).

- **Catégorie contre les chocs électriques : PC1 suivant la norme CEI 127-6.**

- **Conditionnement :**

	SI PTF 15	SI PTF 15B	CTP 140	CPT 140A
1 000 pièces	P 204 943 T	M 209 012 T	S 204 946 T	N 085 595 T
10 pièces	P 204 943 J	M 209 012 J	S 204 946 J	N 085 595 J

- **Electrical characteristics:**
  - Rated voltage: 250 V.
  - Power dissipation: 1,6 W à 40° C.
  - Rated current approved 6,3A.
  - Dielectric Strength: > 3 KV, 50 Hz, 1 min. dry.
  - Contact resistance: < 5 mW.
  - Insulation resistance: > 100 MW.

- **Mounting:** Soldering pins (According IEC 68-2-20). P.C.B. mounting hole : Ø1,5 mm.

- **Material:**
  - **Holder :** Thermoplastics (PPOM° UL 94 V1, Beige.
  - **Cover :** Thermoplastics transparent (CPT 140 SAM) (CPT 140A PC UL 94 V0).
  - **Metal parts copper :** Copper Alloy (CuZn37H30) corrosion proteced (Ni+Sn).

- **Shock Safety: PC1 (IEC standards 127-6).**

- **Packaging:**

	SI PTF 15	SI PTF 15B	CTP 140	CPT 140A
1 000 pieces	P 204 943 T	M 209 012 T	S 204 946 T	N 085 595 T
10 pieces	P 204 943 J	M 209 012 J	S 204 946 J	N 085 595 J

FUSE BASES SI PTF

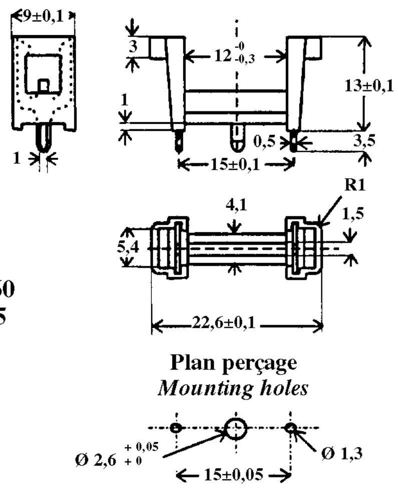
250 V ~ 6,3A

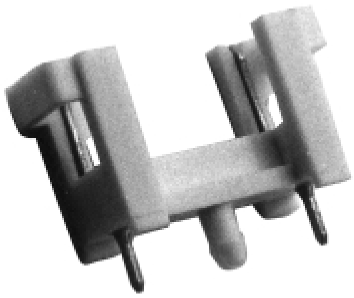
PORTE-FUSIBLES MINIATURES TYPE OUVERT
OPEN-TYPE FUSEHOLDER

SUPPORTS POUR FUSIBLES 5 x 20
FUSE BASE FOR 5 x 20 FUSES
SI PTF 60

Montage sur circuit imprimé pour insertion automatique
Printed circuit board for automatic equipment

Dimensions
Dimensions





Poids maximum (Max weight) : 1,3 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

•Caractéristiques électriques :
- Tension assignée : 250 V.
- Puissance dissipée : 1,6 W à 40° C.
- Courant assigné approuvé : 6,3A.
- Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
- Résistance de contact : < 5 mΩ.
- Résistance d'isolement : > 100 MΩ.

•Montage : Picots à souder (soudabilité conforme à la CEI 68-2-20). Perçage C.I. : 2 x Ø 1,3 mm et 1 x Ø 2,6 mm.

•Matières :
- **Porte-fusibles :** Thermoplastique blanc (PBT) UL 94 V0.
- **Pièces métalliques :** Alliage de cuivre (CuZn37H30) protégé contre la corrosion (Ni+Sn).

•Catégorie contre les chocs électriques : P C 1 suivant la norme CEI 127-6.

•Conditionnement :
Par 1 000 pièces : R 204 945 T
Par 10 pièces : R 204 945 J

•Electrical characteristics:
- Rated voltage: 250 V.
- Power dissipation: 1,6 W à 40° C.
- Rated current approved: 6,3A.
- Dielectric Strength: > 3 KV, 50 Hz, 1 min. dry.
- Contact resistance: < 5 mΩ.
- Insulation resistance: > 100 MΩ.

•Mounting: Soldering pins (According IEC 68-2-20). P.C.B. mounting hole : 2 x Ø 1,3 mm and 1 x Ø 2,6 mm.

•Material:
- **Holder:** Thermoplastics (PBT) UL 94 V0, White.
- **Metal parts copper :** Copper Alloy (CuZn37H30) corrosion proteced (Ni+Sn).

•Shock Safety: PC1 (IEC standard 127-6).

•Packaging:
Per 1,000 pieces : R 204 945 T
Per 10 pieces : R 204 945 J

FUSE BASES

SI PTF

PORTE-FUSIBLES MINIATURES TYPE OUVERT
OPEN-TYPE FUSEHOLDER

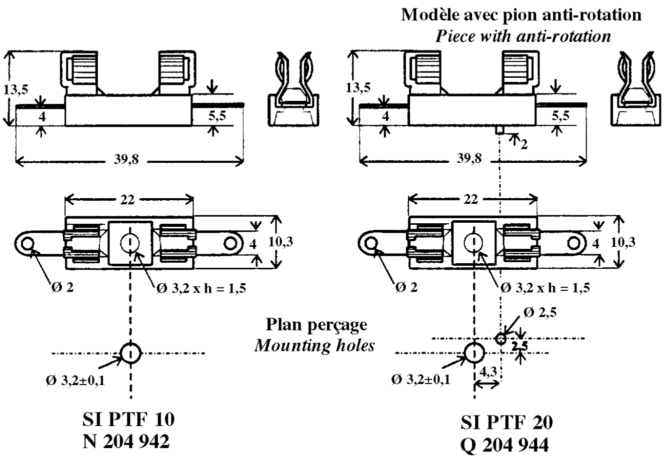
250 V ~ 6,3A

SUPPORTS POUR FUSIBLES 5 x 20
FUSE BASE FOR 5 x 20 FUSES

SI PTF 10 - SI PTF 20

Pour un montage vissé
For screw mounting

Dimensions
Dimensions





Poids maximum (Max weight): 2,2 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

•Caractéristiques électriques :
- Tension assignée : 250 V.
- Puissance dissipée : 1,6 W à 40° C.
- Courant assigné approuvé : 6,3 A.
- Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
- Résistance de contact : < 5 mΩ.
- Résistance d'isolement : > 100 MΩ.

•Montage : Vissé M3.
Perçage : Ø 3,3 mm.

•Matières :
- **Porte-fusibles :** Thermoplastique beige (PPOM) UL 94 V1.
- **Pièces métalliques :** Alliage de cuivre (CuZn37H30) protégé contre la corrosion (Ni+Sn).

•Catégorie contre les chocs électriques : PC1 suivant la norme CEI 127-6.

•Conditionnement :

	SI PTF 10	SI PTF 20
Par 1 000 pièces :	N 204 942 T	Q 204 944 T
Par 10 pièces :	N 204 942 J	Q 204 944 J

•Electrical characteristics:
- Rated voltage: 250 V.
- Power dissipation: 1,6 W à 40° C.
- Rated current approved: 6,3 A.
- Dielectric Strength: > 3 KV, 50 Hz, 1 min. dry.
- Contact resistance: < 5 mΩ.
- Insulation resistance: > 100 MΩ.

•Mounting: Screwed M3.
Mounting hole : Ø 3,3 mm.

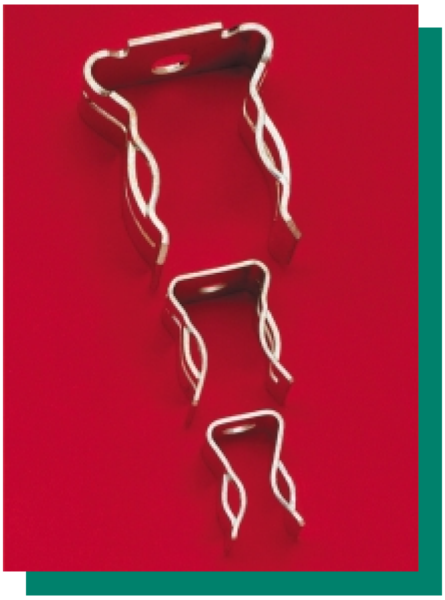
•Material:
- **Holder:** Thermoplastics (PPOM) UL 94 V1, Beige.
- **Metal parts:** Copper Alloy (CuZn37H30) corrosion proteced (Ni+Sn).

•Shock Safety: PC1 (IEC standards 127-6).

•Packaging:

	SI PTF 10	SI PTF 20
Per 1,000 pieces:	N 204 942 T	Q 204 944 T
Per 10 pieces:	N 204 942 J	Q 204 944 J

Clips



30A & 60A FERRULE - FUSE CLIPS

Fuse Clips for 30 & 60 Ampere Ferrule-type Fuses

CAT. NUM.	REF. NUM.	FIG.	FOR FUSE RATING/SIZE:		MOUNTING DETAILS	
			AMPS (max.)	FERRULE DIA.	HOLE SIZE	SCREW SIZE
C08915P	R215479	1	30	13/32"	.172" dia.	#8
C08919P	P217524	2	30	13/32"	.196" dia.	#10
C08916P	V215988	3	30	9/16"	.172" dia.	#8
C08917P	R216491	4	30 or 60	13/16"	.22" x .30"	#10
C08918P	F217010	5	60	1-1/16"	.22" x .30"	#10

All clips are UL Recognized: Guide IZLT2, File E52283
All clips are tin-plated copper alloy, non-spring reinforced.

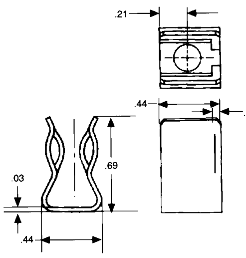


FIGURE 1

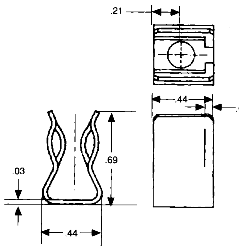


FIGURE 2

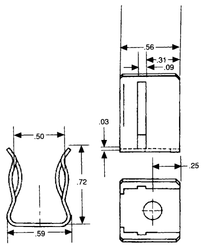


FIGURE 3

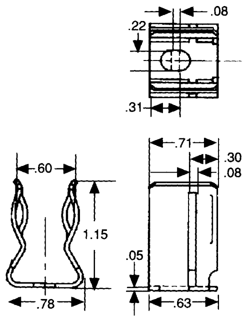


FIGURE 4

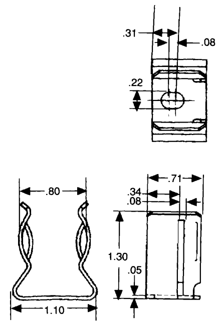
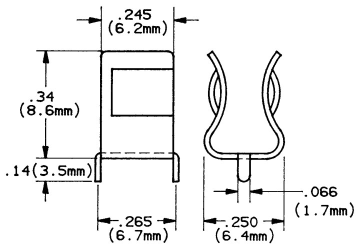


FIGURE 5



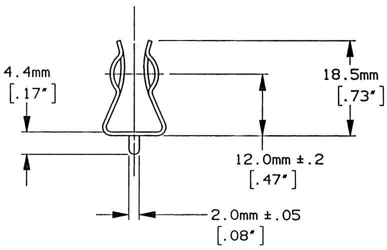
SDC6
PC BOARD CLIPS

- ✔ PC board mount fuse clip
- ✔ For 1/4" diameter fuses
- ✔ Tin plated hard brass



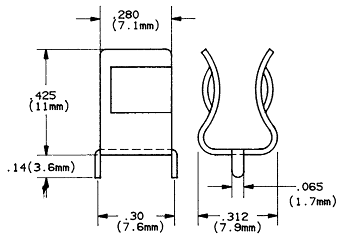
SDC5
PC BOARD CLIPS

- ✔ PC board mount fuse clip
- ✔ For 5mm diameter fuses
- ✔ Tin plated hard brass



SDC7
PC BOARD CLIPS

- ✔ PC board mount fuse clip
- ✔ For 13/32" (10mm) diameter fuses
- ✔ Tin plated spring brass

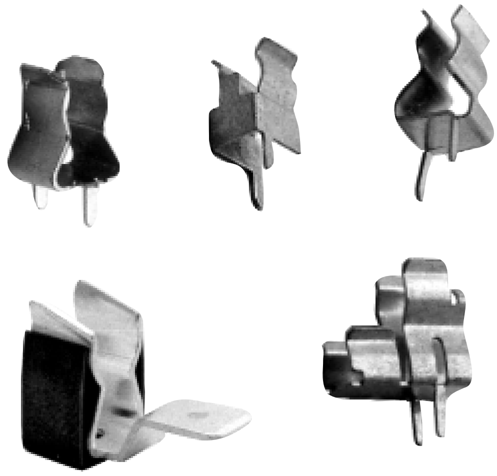


Clips

MR

CLIPS
5x20 and 6x32 FUSE SIZES

- CLIPS FOR PRINTED CIRCUIT BOARD OR SCREW MOUNTING
- RATED CURRENT BELOW 30A* DEPENDING ON TYPE



MAIN CHARACTERISTICS

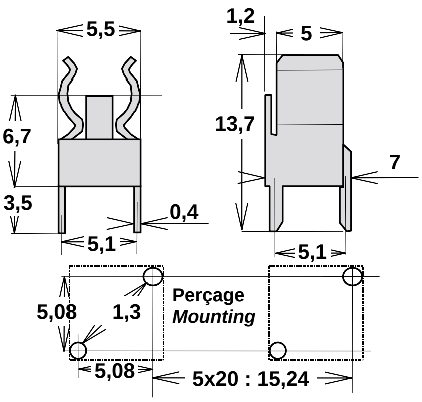
Size	Rated Current	Power acceptance	End Stops	Monting	Material	Designation	References in box of	References blister of
mm	A	W 23°C					1 000 pieces	50 pieces
5x20	6,3A *	1,6	*Yes*	*Printed circuit board*	*Brass,Tin plated*	MR 5 CI.SP	W 202074 T	W 202074 P
5x20	6,3A *	2	*Yes*	*Printed circuit board*	*Brass,Tin plated*	MR 5 CI-S	J 210550 T	J 210550 P
5x20	6,3A *	2,5	*Yes*	*Printed circuit board*	*Bronze,Tin plated*	MR 5 CI-C	K 210551 T	K 210551 P
5x20 & 6x32	6,3A *	1,6	*No*	*Printed circuit board*	*Brass, Nickel plated*	MR 5-6		Y 098967 P
5x20 & 6x32	6,3A *	1,6	*Yes*	*Printed circuit board*	*Brass,Tin plated*	MR 5-6.SP	C 204955 T	C 204955 P
6x32	10A *	2,5	*Yes*	*Printed circuit board*	*Bronze,Tin plated*	MR 6 CI-S	H 210549 T	H 210549 P
6x32	30A *	3,5	*No*	*Screw mounting 6.3 mm slip-on connector tags*	*Silver plated copper + stainless steel spring*	MR 6 VI		K 091480 P

* Depends on fuse cover number for 5x20. L210552P

Clips

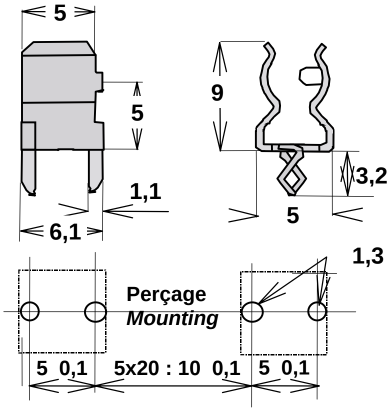
MR

MR 5 CI.SP :



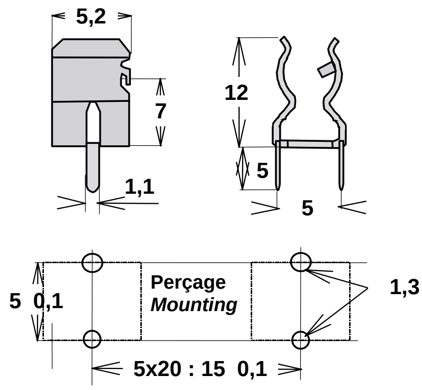
Poids max. 0,4g

MR 5 CI.S :



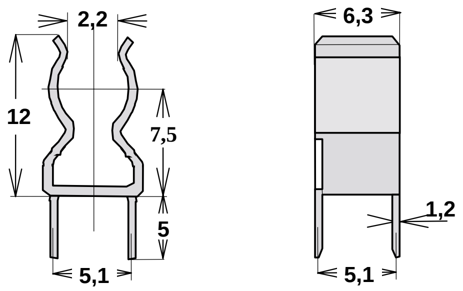
Poids max. 0,5g

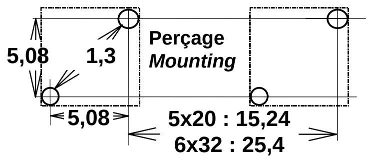
MR 5 CI.C :



Poids max. 0,6g

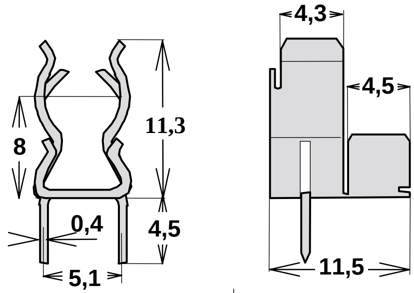
MR 5 - 6 :



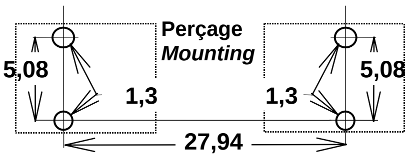


Poids max. 0,6g

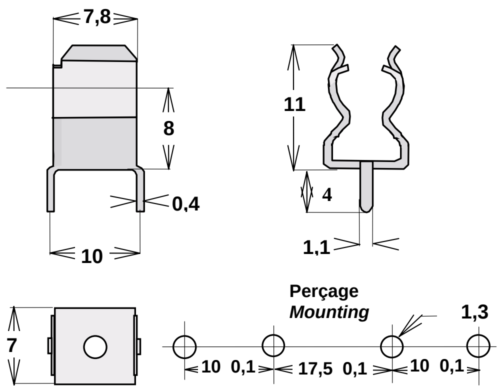
MR 5 - 6 SP :



Poids max. 1g

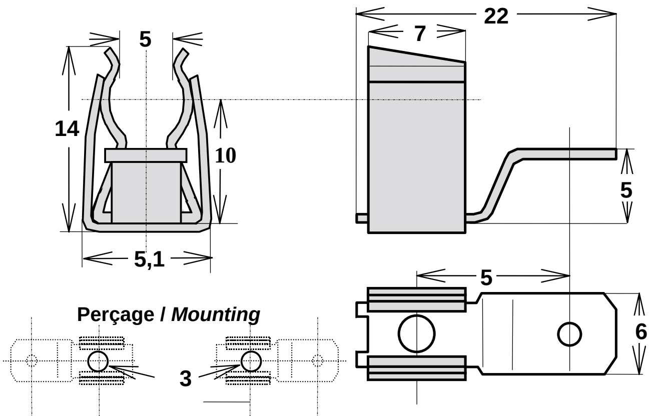


MR 6 CI :



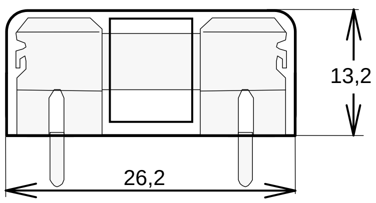
Poids max. 1g

MR 6 VI :



Poids max. 1,8g

CPT 5x20 FOR MR5CI-C & MR5-6 :



Panel Mount Fuse Holders GPM



GPM PANEL MOUNT FUSE HOLDERS

Ferraz Shawmut GPM Panel Mount Fuse Holders are in sizes to accommodate 5mm x 20mm, 1/4" x 1-1/4", Class CC and Midget (1-1/2" x 13/32") fuses. All 30A holders have glass-filled polyester insulators for extra dependability and trouble-free installation. Patented design allows same body to accept screw or bayonet knob. Flange design allows front or rear mounting. The 10A and 15A holders are for front mounting only.

Approvals

✔ **GPM-A, GPM-G:**
UL Recognized, Guide IZLT2, File E118864
CSA Certified, Class 908501, File AP82191

✔ **All others:**
UL Recognized, Guide IZLT2, File E52283
CSA Certified, Class 6225, File 32169

RECOMMENDED FUSE USAGE

GPM Fuse Holders will accommodate these Ferraz Shawmut fuses:

GPM-A: GGM, GGA, GSC
GPM-G: GSA, GDL, GGC, GSB, GDG, GAB
GPM-SRR, GPM-BRR, GPM-WTR: ATQR, ATDR, ATMR
GPM-S, GPM-B, GPM-WT: ATQ, ATM, TRM, OTM, GGU, A13X-2, A25Z-2, A60Q-2, A6Y-2B

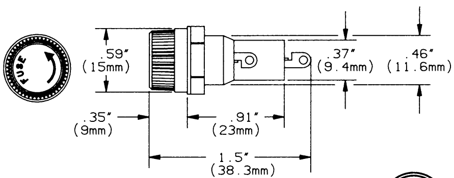


Figure 1

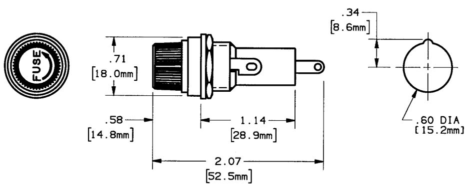


Figure 2

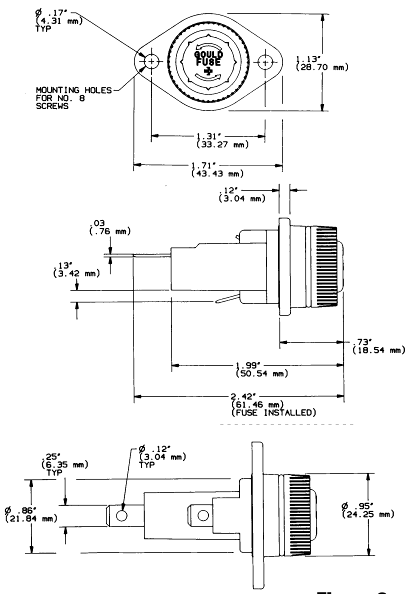


Figure 3

Descriptions

CAT. NUMBER	REF. NUMBER	FIG.	CAP TYPE	AMPS	VOLTS	FUSE TYPE	TERMINAL TYPE
GPM-A	M213451	1	Screw Knob	10	250	5mm x 20mm	Solder
GPM-G	G213952	2	Screw Knob	15	250	1/4" x 1-1/4"	Solder
GPM-S	M216487	3	Screw Knob	30	600	1-1/2" x 13/32"	1/4" Quick-connect/Solder
GPM-SRR	A217005	3	Screw Knob	30	600	Class CC	1/4" Quick-connect/Solder
GPM-B	L215474	3	1/4 Turn Bayonet Knob	30	600	1-1/2" x 13/32"	1/4" Quick-connect/Solder
GPM-BRR	P215983	3	1/4 Turn Bayonet Knob	30	600	Class CC	1/4" Quick-connect/Solder
GPM-WT	K217520	3	Water-tight Screw Knob	30	600	1-1/2" x 13/32"	1/4" Quick-connect/Solder
GPM-WTR	V218035	3	Water-tight Screw Knob	30	600	Class CC	1/4" Quick-connect/Solder

Fuse holders

PU PTF

PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSE HOLDER

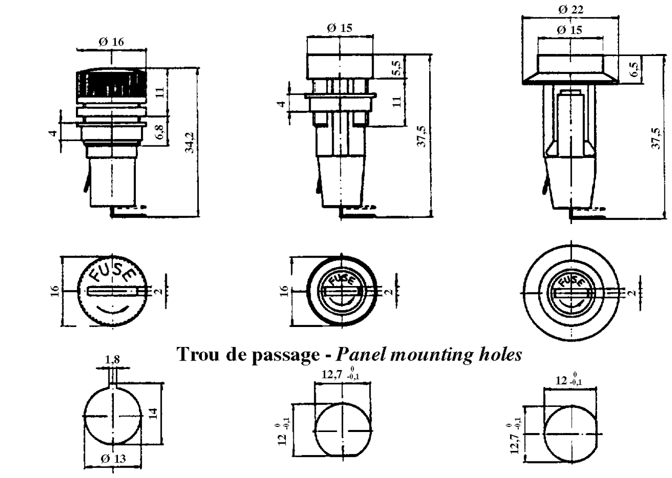
Montage sur panneau. Bouchon vissé.
Front panel mounting. Screw cover.

250 V ~ 6,3A

PORTE-FUSIBLE À PUITS 5 x 20
SHOCK-SAFE FUSE HOLDER 5 x 20

PU PTF 30 - PU PTF 35 - PU PTF 40

Dimensions
Dimensions



T 204 947 PU PTF 30 6 g

V 204 948 PU PTF 35 4 g

W 204 949 PU PTF 40 4,5 g



PU PTF 30 : non homologué / non-certified

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

- **Caractéristiques électriques :**
  - Tension assignée : 250 V.
  - Puissance dissipée : 2,5 W à 40° C.
  - Courant assigné : 6,3A.
  - Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
  - Résistance de contact : < 5 mW.
  - Résistance d'isolement : > 100 MW.

- **Montage :**

	PU PTF 30	PU PTF 35	PU PTF 40
Epaisseur de paroi :	1 à 3 mm	1 à 6 mm	0,8 à 2,5 mm
Couple de serrage :	max. 1,2 N.m	max. 1,2 N.m	Encliquetable

- **Raccordements :** Languette à souder ou cosses à enficher d'épaisseur 0,5 mm et de 2,8 mm de largeur.

- **Matières :**
  - **Porte-fusibles :** Thermoplastique noir (PC) UL 94 V0.
  - **Capuchons :** Thermoplastique noir (PC) UL 94 V0.
  - **Pièces métalliques :** Alliage de cuivre (CuZn37) protégé contre la corrosion (Ni+Sn).

- **Catégorie contre les chocs électriques : PC2 suivant la norme CEI 127-6.**

- **Conditionnement :**

	PU PTF 30	PU PTF 35	PU PTF 40
Pour 1 000 pièces :	T 204 947 T	V 204 948 T	W 204 949 T
Pour 10 pièces :	T 204 947 J	V 204 948 J	W 204 949 J

- **Electrical characteristics :**
  - Rated voltage : 250 V.
  - Power dissipation : 2,5 W à 40° C.
  - Rated current : 6,3A.
  - Dielectric Strenght : > 3 KV, 50 Hz, 1 min. dry.
  - Contact resistance : < 5 mW.
  - Insulation resistance : > 100 MW.

- **Mounting :**

	PU PTF 30	PU PTF 35	PU PTF 40
Thickness panel :	1 to 3 mm	1 to 6 mm	0,8 to 2,5 mm
Tightening torque :	max. 1,2 N.m	max. 1,2 N.m	

- **Connections :** slip-on connectors type 2,8 thickness 0,5 mm can be soldered.

- **Material :**
  - **Holder :** Thermoplastics (PC) UL 94 V0, Black.
  - **Cover :** Thermoplastics (PC) UL 94 V0, Black.
  - **Metal parts copper :** Copper Alloy (CuZn37) corrosion protected (Ni+Sn).

- **Shock Safety : PC2 (IEC standards 127-6).**

- **Packaging :**

	PU PTF 30	PU PTF 35	PU PTF 40
Per 1 000 pieces :	T 204 947 T	V 204 948 T	W 204 949 T
Per 10 pieces :	T 204 947 J	V 204 948 J	W 204 949 J

Fuse holders

PU PTF

PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSEHOLDER

250 V ~ 10A - 250 V ~ 6,3A

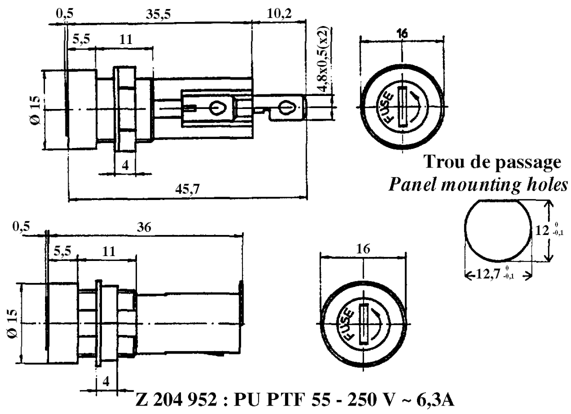
PORTE-FUSIBLE À PUITS 5 x 20
SHOCK-SAFE FUSEHOLDER 5 x 20

PU PTF 70 - PU PTF 55

Montage sur panneau. Bouchon à Bayonnet.
Front panel mounting. Bayonet cover.

Dimensions
Dimensions

A 204 953 : PU PTF 70 - 250 V ~ 10A



Z 204 952 : PU PTF 55 - 250 V ~ 6,3A



Poids maximum : PU PTF 70 : 6 g
(Max weight) PU PTF 55 : 5,5 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

- **Caractéristiques électriques :**
  - Tension assignée : 250 V.
  - Puissance dissipée : 2,5 W à 40° C.
  - Courant assigné : 10A PU PTF 70 - 6,3A PU PTF 55
  - Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
  - Résistance de contact : < 5 mW.
  - Résistance d'isolement : > 100 MW.

- **Montage :** Sur panneau d'épaisseur 1 à 6 mm (Anti rotation voir dessin de perçage). Couple de serrage maxi : 1,2 N.m.

- **Raccordements :** Languette à souder ou cosses à enficher e = 0,5 mm PU PTF 70 cosses 4,8 mm - PU PTF 55 cosses 2,8 mm.

- **Matières :**
  - **Porte-fusibles :** Thermoplastique noir (PC) UL 94 V0.
  - **Capuchons :** Thermoplastique noir (PBT) UL 94 V0.
  - **Pièces métalliques :** Alliage de cuivre (CuZn37) protégé contre la corrosion (Ni+Sn).

- **Catégorie contre les chocs électriques : PC2 suivant la norme CEI 127-6.**

- **Conditionnement :**

	PU PTF 70	PU PTF 55
Par 1 000 pièces :	A 204 953 T	Z 204 952 T
Par 10 pièces :	A 204 953 J	Z 204 952 J

- **Electrical characteristics:**
  - Rated voltage: 250 V.
  - Power dissipation: 2,5 W à 40° C.
  - Rated current: 10A PU PTF 70 - 6,3A PU PTF 55
  - Dielectric strength: > 3 KV, 50 Hz, 1 min. dry.
  - Contact resistance: < 5 mW.
  - Insulation resistance: > 100 MW.

- **Mounting:** Front panel thickness from 1 to 6 mm (punched hole : see drawing). Max. tightening torque : 1,2 N.m.

- **Connections:** Slip-on connectors type 4,8 for PU PTF 70 and 2,8 for PU PTF 55, thickness 0,5 mm can be soldered.

- **Material:**
  - **Holder:** Thermoplastics (PC) UL 94 V0, Black.
  - **Cover:** Thermoplastics (PBT) UL 94 V0, Black.
  - **Metal parts:** Copper Alloy (CuZn37) corrosion protected (Ni+Sn).

- **Shock Safety: PC2 (IEC standards 127-6).**

- **Packaging:**

	PU PTF 70	PU PTF 55
Per 1,000 pieces:	A 204 953 T	Z 204 952 T
Per 10 pieces:	A 204 953 J	Z 204 952 J

Fuse holders

PU PTF

PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS

SHOCK-SAFE FUSE HOLDER

250 V ~ 6,3A

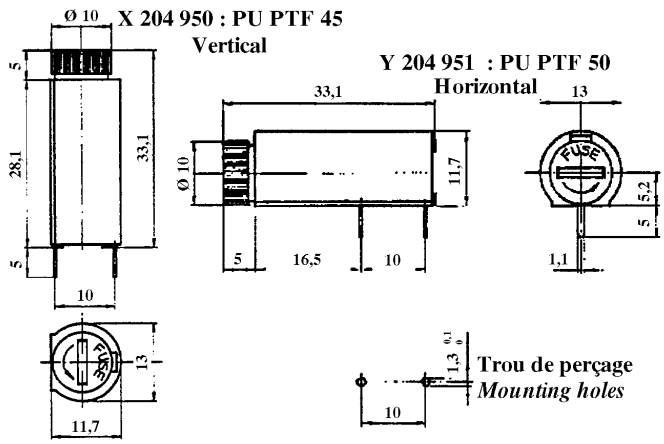
PORTE-FUSIBLE À PUITS 5 x 20

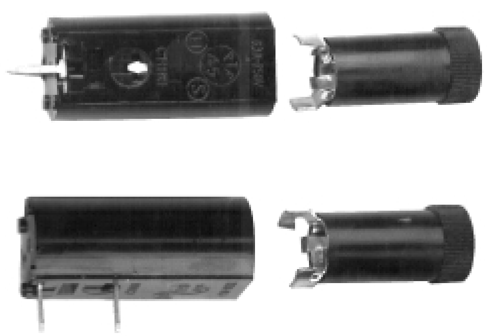
SHOCK-SAFE FUSEHOLDER 5 x 20

PU PTF 45 - PU PTF 50

Montage sur circuit imprimé. Bouchon à Bayonnet.
Printed circuit board mounting. Bayonet cover.

Dimensions
Dimensions





Poids maximum : PU PTF 45 : 5 g
(Max weight) PU PTF 50 : 5 g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

•Caractéristiques électriques :
- Tension assignée : 250 V.
- Puissance dissipée : 2,5 W à 40° C.
- Courant assigné : 6,3A.
- Tenue diélectrique : > 3 KV, 50 Hz, 1 min. sèche.
- Résistance de contact : < 5 mΩ.
- Résistance d'isolement : > 100 MΩ.

•Montage et raccordements : vertical (PU PTF 45) ou horizontal (PU PTF 50) sur circuit imprimé par picot à souder 0,5 x 1,1 mm. Soudabilité conforme à la CEI 68-2-2.

•Matières :
- **Porte-fusibles :** Thermoplastique noir (PC) UL 94 V0.
- **Capuchons :** Thermoplastique noir (PBT) UL 94 V0.
- **Pièces métalliques :** Alliage de cuivre (CuZn37) protégé contre la corrosion (Ni+Sn).

•Catégorie contre les chocs électriques : PC2 suivant la norme CEI 127-6.

•Conditionnement :

	PU PTF 45	PU PTF 50
Par 1 000 pièces :	X 204 950 T	Y 204 951 T
Par 10 pièces :	X 204 950 J	Y 204 951 J

•Electrical characteristics:
- Rated voltage: 250 V.
- Power dissipation: 2,5 W à 40° C.
- Rated current : 6,3A.
- Dielectric strength: > 3 KV, 50 Hz, 1 min. dry.
- Contact resistance: < 5 mΩ.
- Insulation resistance: > 100 MΩ.

•Mounting and Connections: printed circuit board, vertical (PU PTF 45) or horizontal (PU PTF 50) mount. Soldering pins 0,5 x 1,1 mm. Solderability in accordance with IEC 68-2-2.

•Material:
- **Holder:** Thermoplastics (PC) UL 94 V0, Black.
- **Cover:** Thermoplastics (PBT) UL 94 V0, Black.
- **Metal parts:** Copper Alloy (CuZn37) corrosion protected (Ni+Sn).

•Shock Safety: PC2 (IEC standard 127-6).

•Packaging:

	PU PTF 45	PU PTF 50
Per 1,000 pieces:	X 204 950 T	Y 204 951 T
Per 10 pieces:	X 204 950 J	Y 204 951 J

Miniature Fuses

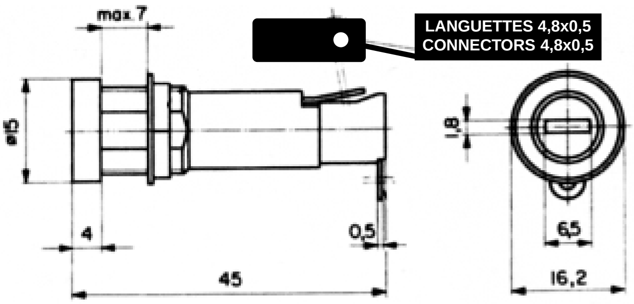
Fuse holders PU

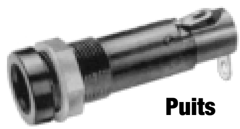
PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSE HOLDER

Selon normes : EN 60 127-6, UL 512, EN 60 257.
As per standards: IEC 127-6, UL512, IEC257.

250V ~ 10A Montage frontal
POUR FUSIBLES 5x20 et 6x32
FOR 5X20 AND 6X32 FUSES
PU PANEL 5-6 A LANGUETTES

Dimensions
Dimensions





Puits

5x20

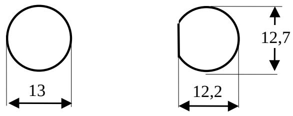


Bouchons

6x32



Plan de percage
Panel mounting hole



Poids maximum / Max weight :
Puits (receptacle) :
T 210 536 : 5g
Bouchons (Fuse carrier) :
5x20 X 210 539 : 2,5g
6x32 Y 210 540 : 2,5g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Caractéristiques électriques :
- Tension assignée : 250V.
- Puissance dissipée admissible du fusible :
fusible 5x20 : 4W ; fusible 6x32 : 4W à 23°C.
- Courant assigné approuvé : 10A selon CEI 127
et 16A selon UL.
- Tension d'essai 4KV, 50Hz, 1min sèche.
- Classe de protection : PC2 selon CEI 127 ou IP 40 selon EN60 529.
- Température limite d'utilisation : -25°C à 85°C déclassement
en puissance nécessaire en fonction du courant et de la température.
- Résistance de contact : 5mW.
- Résistance d'isolement (500VDC/1min) : > 103MW

Montage :
Montage frontal couple de serrage max 1,2Nm.

Raccordement par languette à souder ou à cosse de 4,8x0,5mm à clipper.

Bouchon : Type baïonnette - Fente pour tournevis
5x20 X210539J par 10 pièces & X210539Q par 100 pièces
6x32 Y210540J par 10 pièces & Y210540Q par 100 pièces

Puits :
T210536J par 10 pièces & T210536Q par 100 pièces

Electrical characteristics:
- Rated voltage: 250V.
- Admissible fuse power dissipation:
5X20 fuses 4W ;6x32 fuses 4W at 23°C.
- Rated current approved: 10A according to IEC 127 and 16A
according to UL.
- Dielectric strength: 4KV, 50Hz, 1min dry.
- Protection class: PC2 according IEC 127 or IP 40 according EN 60 529.
- Allowable ambient air temperatues Ta for accessible parts :
25*°C to 85+C (Derating admissible power acceptance)
- Contact resistance: 5mW.
- Isulation resistance (500VDC/1min) : > 103MW

Mounting:
Front panel mounting. Torque/Fixing nut : max. 1,2 Nm.

Slip-on connectors type 4,8mm X 0,5mm, can be soldered..

Fuse carrier: with bayonet fixing, screwdriver slot.
5x20 X210539J per 10 pieces & X210539Q per 100 pieces
6x32 Y210540J per 10 pieces & Y210540Q per 100 pieces

Receptacle:
T210536J per 10 pieces & T210536Q per 100 pieces

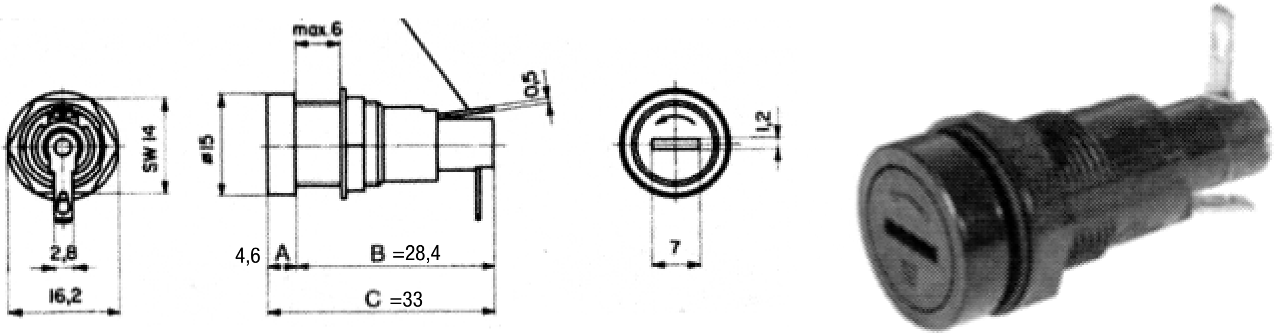
Fuse holders PU

PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSE HOLDER

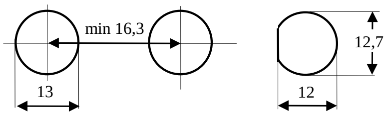
Selon normes : EN 60 127-6, UL 512, EN 60 257.
As per standards: IEC 127-6, UL512, IEC257.

250V ~ 10A IP65
POUR FUSIBLES 5x20
FOR 5X20 FUSES
PU 5x20 IP65 COMPLET

Dimensions
Dimensions



Plan de percage
Panel mounting hole



Poids maximum :	Puits & bouchon	F 210 547 : 5g
Max weight :	Receptacle & Fuse carrier	F 210 547 : 5g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Caractéristiques électriques :
- Tension assignée : 250V.
- Puissance dissipée admissible du fusible : 2,5W à 23°C
- Courant assigné approuvé : 6,3A selon CEI 127 et 10A selon UL.
- Tension d'essai 4KV, 50Hz, 1min sèche.
- Classe de protection : PC2 selon CEI 127 ou IP 65 selon EN60 529.
- Température limite d'utilisation : -25°C à 85°C déclassement en puissance nécessaire en fonction du courant et de la température.
- Résistance de contact : 5mW.
- Résistance d'isolement (500VDC/1min) : > 102MW

Montage :
Montage frontal couple de serrage max 1,2Nm.

Raccordement par languette à souder ou à cosse de 2,8x0,5mm à clipper.

Bouchon : vissé C = 0,35Nm - Fente pour tournevis
Livré avec le puits

Puits & bouchon :
F210547J par 10 pièces & F210547Q par 100 pièces

Electrical characteristics:
- Rated voltage: 250V.
- Admissible fuse power dissipation: 2,5W à 23°C.
- Rated current approved: 6,3A according to IEC 127 and 10A as per UL.
- Dielectric strength: 4KV, 50Hz, 1min dry.
- Protection class: PC2 according IEC 127 or IP 65 according EN 60 529.
- Allowable ambient air temperatures for accessible parts: 25*°C to 85+C (Derating admissible power acceptance)
- Contact resistance: 5mW.
- Isulation resistance (500VDC/1min): > 102MW

Mounting:
Front panel mounting. Torque/Fixing nut: max. 1,2 Nm.

Slip-on connectors type 2,8mm X 0,5mm, can be soldered.

Fuse carrier: screw type, screwdriver slot, torque 0,35NNm.

Receptacle & fuse carrier:
F210547J per 10 pieces & F210547Q per 100 pieces

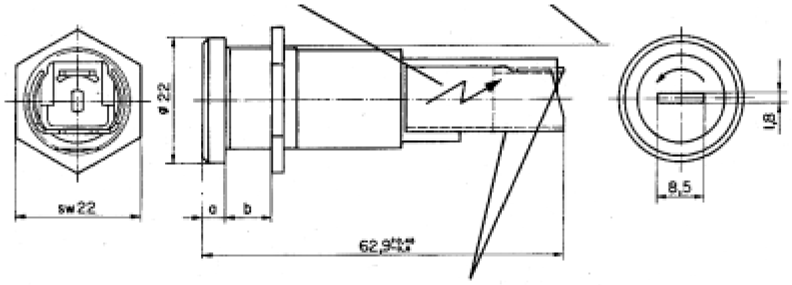
Fuse holders **PU**

PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSE HOLDER

Selon normes : EN 60 127-6, UL 512, EN 60 257.
As per standards: IEC 127-6, UL512, IEC257.

250V ~ 16A IP67
POUR FUSIBLES 5x20 et 6x32
FOR 5X20 AND 6X32 FUSES

Dimensions
Dimensions





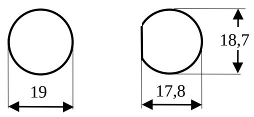
Bouchon 5x20





Bouchon 6x32

Plan de percage
Panel mounting hole



Poids maximum : Max weight :	Puits (receptacle)		A 210 542 : 10g
	Bouchons(Fuse carrier)	5x20	C 210 544 : 2,5g
		6x32	E 210 546 : 2,5g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Caractéristiques électriques :
- Tension assignée : 250V.
- Puissance dissipée admissible du fusible : 4W à 23°C
- Courant assigné approuvé : 16A selon CEI 127
et 30A selon UL.
- Tension d'essai 4KV, 50Hz, 1min sèche.
- Classe de protection : PC2 selon CEI 127 ou IP 67 selon EN60 529.
- Température limite d'utilisation : -25°C à 85°C déclassement
en puissance nécessaire en fonction du courant et de la température.
- Résistance de contact : 3,5mW.
- Résistance d'isolement (500VDC/1min) : > 103MW

Montage :
Montage frontal couple de serrage max 2,4Nm.

Raccordement par languette à souder ou à cosse de 6,3x0,8 mm à clipper. Section recommandée du conducteur 6mm².

Bouchon : à visser - Fente pour un tournevis
5x20 C210544J par 10 pièces & C210544Q par 100 pièces
6x32 E210546J par 10 pièces & E210546Q par 100 pièces

Puits :
A210542J par 10 pièces & A210542Q par 100 pièces

Electrical characteristics :
- Rated voltage : 250V.
- Admissible fuse power dissipation : 4W à 23°C.
- Rated current approved : 16A according to IEC 127 and 30A
according to UL.
- Dielectric strength : 4KV, 50Hz, 1min dry.
- Protection class : PC2 according IEC 127 or IP 67 according EN 60 529.
- Allowable ambient air temperatues Ta for accessible parts :
25*°C to 85+C (Derating admissible power acceptance)
- Contact resistance : 3,5mW.
- Isulation resistance (500VDC/1min) : > 103MW

Mounting:
Front panel mounting. Torque/Fixing nut : max. 2.4 Nm.

Slip-on connectors type 6.3mm X 0.8mm, can be soldered. Cross-section 6mm².

Fuse carrier: screw type, screwdriver slot.
5x20 C210544J per 10 pieces & C210544Q per 100 pieces
6x32 E210546J per 10 pieces & E210546Q per 100 pieces

Receptacle:
A210542J per 10 pieces & A210542Q per 100 pieces

Fuse holders

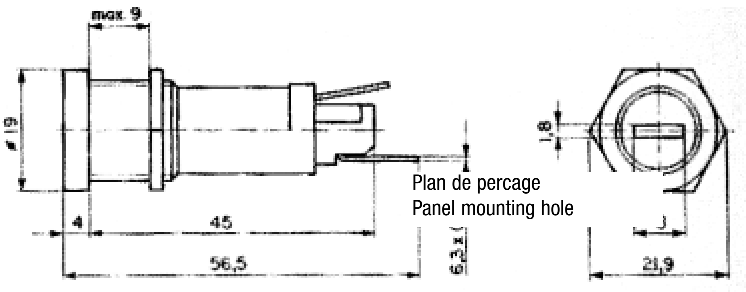
PU

PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSE HOLDER

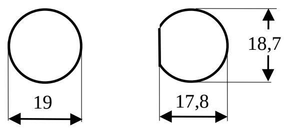
Selon normes : EN 60 127-6, UL 512, EN 60 257.
As per standards: IEC 127-6, UL512, IEC257.

500V ~ 10A
POUR FUSIBLES 5x20 et 6x32
FOR 5X20 AND 6X32 FUSES
PU 500V 5-6 A LANGUETTES

Dimensions
Dimensions







Poids maximum : Max weight :	Puits (receptacle) Bouchons(Fuse carrier) 5x20 6x32	A 210 542 : 10g C 210 544 : 2,5g E 210 546 : 2,5g

CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Caractéristiques électriques :
- Tension assignée : 250V.
- Puissance dissipée admissible du fusible : 4W à 23°C
- Courant assigné approuvé : 16A selon CEI 127 et 30A selon UL.
- Tension d'essai 4KV, 50Hz, 1min sèche.
- Classe de protection : PC2 selon CEI 127 ou IP 67 selon EN60 529.
- Température limite d'utilisation : -25°C à 85°C déclassement en puissance nécessaire en fonction du courant et de la température.
- Résistance de contact : 3,5mW.
- Résistance d'isolement (500VDC/1min) : > 103MW

Montage :
Montage frontal couple de serrage max 2,4Nm.

Raccordement par languette à souder ou à cosse de 6,3x0,8 mm à clipper. Section recommandée du conducteur 6mm².

Bouchon : à visser - Fente pour un tournevis
5x20 C210544J par 10 pièces & C210544Q par 100 pièces
6x32 E210546J par 10 pièces & E210546Q par 100 pièces

Puits :
A210542J par 10 pièces & A210542Q par 100 pièces

Electrical characteristics:
- Rated voltage: 250V.
- Admissible fuse power dissipation : 4W à 23°C.
- Rated current approved: 16A as per IEC 127 and 30A as per UL.
- Dielectric strengt : 4KV, 50Hz, 1min dry.
- Protection class: PC2 according IEC 127 or IP 67 according EN 60 529.
- Allowable ambient air temperatues Ta for accessible parts : 25*°C to 85+C (Derating admissible power acceptance)
- Contact resistance: 3,5mW.
- Isulation resistance (500VDC/1min) : > 103MW

Mounting:
Front panel mounting. Torque/Fixing nut: max. 2,4 Nm.

Slip-on connectors type 6,3mm thickness 0,8mm can be soldered. Cross-section 6mm².

Fuse carrier: screw type, screwdriver slot.
5x20 C210544J per 10 pieces & C210544Q per 100 pieces
6x32 E210546J per 10 pieces & E210546Q per 100 pieces

Receptacle:
A210542J per 10 pieces & A210542Q per 100 pieces

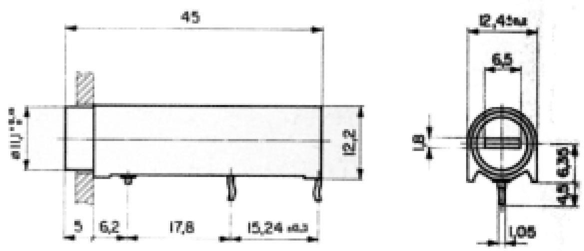
Fuse holders PU

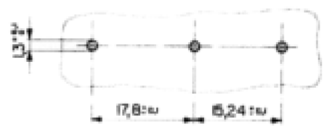
PORTE-FUSIBLES MINIATURES À PUITS PROTÉGÉS
SHOCK-SAFE FUSE HOLDER

Selon normes : EN 60 127-6, UL 512, EN 60 257.
As per standards: IEC 127-6, UL512, IEC257.

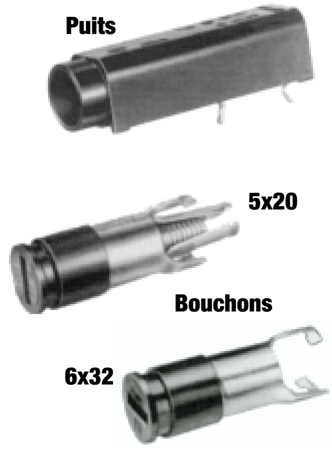
250V ~ 10A montage horizontal
POUR FUSIBLES 5x20 et 6x32
FOR 5X20 AND 6X32 FUSES
PU CI-H 5-6 PICOTS

Dimensions
Dimensions





Poids maximum / Max weight :
Puits (receptacle) :
W 210 538 : 5g
Bouchons (Fuse carrier) :
5x20 X 210 539 : 2,5g
6x32 Y 210 540 : 2,5g



CARACTERISTIQUES PRINCIPALES
BASIC CHARACTERISTICS

Caractéristiques électriques :
- Tension assignée : 250V.
- Puissance dissipée admissible du fusible :
fusible 5x20 : 2,5W ; fusible 6x32 : 3,2W à 23°C.
- Courant assigné approuvé : 10A selon CEI 127
et 16A selon UL.
- Tension d'essai 4KV, 50Hz, 1min sèche.
- Classe de protection : PC2 selon CEI 127 ou IP 40 selon EN60 529.
- Température limite d'utilisation : -25°C à 85°C déclassement
en puissance nécessaire en fonction du courant et de la température.
- Résistance de contact : 5mW.
- Résistance d'isolement (500VDC/1min) : > 103MW

Montage :
Montage horizontal.

Raccordement par soudure sur CI. 350°C / 5s

Bouchon : Type baïonnette - Fente pour tournevis
5x20 X210539J par 10 pièces & X210539Q par 100 pièces
6x32 Y210540J par 10 pièces & Y210540Q par 100 pièces

Puits :
W210538J par 10 pièces & W210538Q par 100 pièces

Electrical characteristics:
- Rated voltage: 250V.
- Admissible fuse power dissipation:
5X20 fuses 2,5W ;6x32 fuses 3,2W at 23°C.
- Rated current approved: 10A according to IEC 127 and 16A
according to UL.
- Dielectric strength: 4KV, 50Hz, 1min dry.
- Protection class: PC2 according IEC 127 or IP 40 according EN 60 529.
- Allowable ambient air temperatues Ta for accessible parts:
25*°C to 85+C (Derating admissible power acceptance)
- Contact resistance: 5mW.
- Isulation resistance (500VDC/1min) : > 103MW

Mounting:
PCB mount horizontal.

Solderability 235°C 5s.

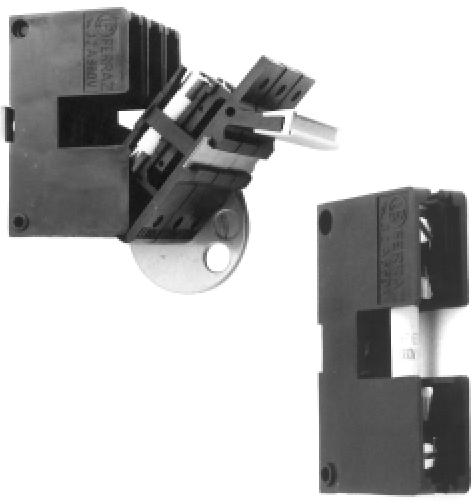
Fuse carrier: with bayonet fixing, screwdriver slot.
5x20 X210539J per 10 pieces & X210539Q per 100 pieces
6x32 Y210540J per 10 pieces & Y210540Q per 100 pieces

Receptacle:
W210538J per 10 pieces & W210538Q per 100 pieces

Fuse holders and fuse disconnectors SI 6.32

DISCONNECTORS AND HOLDERS FOR FERRULE-TYPE FUSES 6.3 x 32

- COMPLIANCE WITH IEC 947-3.
- MOUNTING ON SYMMETRICAL OR ASYMMETRICAL 35 mm DIN-RAIL.
- PROTECTION AGAINST TOUCHING OF LIVE PARTS.
- PROTECTION DEGREE: IP 2X FOR DISCONNECTORS (WHEN DEVICE IS CONNECTED AND CLOSED)
- SILVER-PLATED CLIPS WITH ELASTIC CLAMPING.
- SELF-EXTINGUISHING MATERIAL V0-CLASS AS PER UL94.
- PADLOCKING DEVICE, BLOWN FUSE INDICATION THROUGH L.E.D ON REQUEST.
- SALT SPRAY-PROOF VERSION AVAILABLE ON REQUEST.



MAIN ELECTRICAL CHARACTERISTICS

Insulation voltage: 690 V
Rated conventional current Ith: 32 A
Permissible max. power: 3,5 W
Impulse withstand voltage Uimp: 8 kV
Overload current limitation:
- Fuseholders without grip with FERRAZ SHAWMUT fuses: No limitation
- Disconnector with FERRAZ SHAWMUT fuse rated 10 A: No limitation
- Disconnector with FERRAZ SHAWMUT fuse rated > 10 A: Clearing of overloads longer than 200 s by another protection device (thermal relay or other)

Operation class: AC 20 B
Short-circuit withstand current with Ferraz Shawmut fuses: Ic maxi = 4,7 kA.
Power frequency withstand voltage: 2.5 Kv, 50 Hz during 1 min.

Connections: CC type: Screw clamp terminals for copper cables with 10 mm² max. section.
LL type : 6.3 mm clips.
LC type : Upstream clips and downstream screw clamp terminals.
- Recommended tightening torque for clamp terminals: 1.2 Nm to 1.4 Nm.
- Maximum tightening torque for holders: 1.5 to 2 Nm.

Blown fuse indication auxiliary contact:
- Factory mounted and operating only with a 6.3x32 fuse with trip-indicator

	Non inductive load			Inductive load cosφ=0.6 or L/R=2.5 ms		
	30 V	110 V	250 V	30 V	110 V	250 V
AC interrupting rating	....	5 A	5 A	....	5 A	5 A
DC interrupting rating	4 A	0.4 A	....	2 A	0.4 A	....

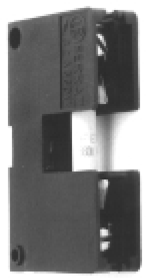
- Minimum voltage-current for a certain operating: 24 V 10 mA
- Connection: Soldering or 2.8 mm clips

Blown-fuse LED indication:
- In-factory mounted . DC: 1 LED with polarization + 1 LED with upstream terminal; AC: 2 LEDs.
- Maximum operating voltage according to models: up to 250 V (AC and DC)
- Current after fuse blowing : 1.7 mA to 6 mA.

Miniature Fuses

Fuse holders and fuse disconnectors SI 6.32

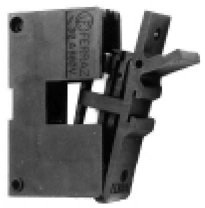
HOLDERS WITHOUT GRIP



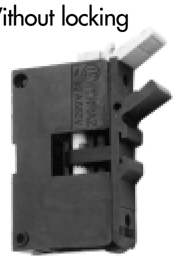
Ref. Number	Cat. Number	Connecting	Packaging	unit weight
M091482	SI 6.32 CC	Screw clamp	10	30g
Z091746	SI 6.32 LL	6.3 mm clips.	10	30g
J091939	SI 6.32 LC	Upstream clips and downstream screw clamp	10	30g

No protection against live terminals and fuse touching.
Mounting: Directly screwed on base or snapped on DIN-rail an adaptation (refer to accessories).

DISCONNECTORS WITH OR WITHOUT INTERLOCKING



Without locking



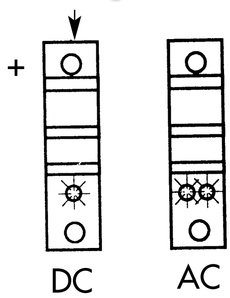
With locking grip

Ref. Number	Cat. Number	Connecting	Packaging	unit weight
N091483	SI 6.32 CC PRE	Screw clamp	10	38g
M091942	SI 6.32 PRE V	Screw clamp with lock	10	40g
G082990	SI 6.32 CC PRE BS M	Bornes à cage avec action positive pour sortir le fusible	10	40g
E091728	SI 6.32 LL PRE	6.3 mm clips	10	38g
Q091945	SI 6.32 LL PRE V	6.3 mm clips with locking	10	40g
R091946	SI 6.32 LC PRE	Upstream clips and downstream screw clamp	10	38g
W091973	SI 6.32 LC PRE V	Upstr. clips and downstr. screw clamp with locking	10	40g

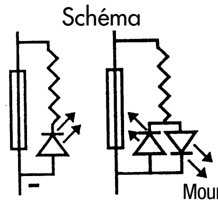
Mounting : Directly screwed on base or snapped on DIN-rail an adaptation (refer to accessories).

DISCONNECTORS WITH LED INDICATION





Schéma



Ref. Number	Cat. Number	Connecting	Max. voltage of the circuit	Packaging	Unit weight
F091982	SI 6.32 CC PRE D 30	Screw clamp	30V DC Upstream terminal at plus	5	40g
Q092014	SI 6.32 LL PRE D 30	6.3 mm clips			
A092046	SI 6.32 LC PRE D 30	Clip upstr./Clamp downstr.			
G091983	SI 6.32 CC PRE D 50	Screw clamp	50V DC Upstream terminal at plus	5	40g
W092019	SI 6.32 LL PRE D 50	6.3 mm clips			
B092047	SI 6.32 LC PRE D 50	Clip upstr./Clamp downstr.			
A091954	SI 6.32 CC PRE D 125	Screw clamp	125V DC Upstream terminal at plus	5	40g
S092016	SI 6.32 LL PRE D 125	6.3 mm clips			
C092048	SI 6.32 LC PRE D 125	Clip upstr./Clamp downstr.			
J091985	SI 6.32 CC PRE D 250	Screw clamp	250V DC Upstream terminal at plus	5	40g
T092017	SI 6.32 LL PRE D 250	6.3 mm clips			
D092049	SI 6.32 LC PRE 2D 250	Clip upstr./Clamp downstr.			
K091986	SI 6.32 CC PRE 2D 30	Screw clamp	30V AC	5	40g
V092018	SI 6.32 LL PRE 2D 30	6.3 mm clips			
E092050	SI 6.32 LC PRE 2D 30	Clip upstr./Clamp downstr.			
L091987	SI 6.32 CC PRE 2D 50	Screw clamp	50V AC	5	40g
R092015	SI 6.32 LL PRE 2D 50	6.3 mm clips			
F092051	SI 6.32 LC PRE 2D 125	Clip upstr./Clamp downstr.			
M091988	SI 6.32 CC PRE 2D 125	Screw clamp	125V AC	5	40g
X092020	SI 6.32 LL PRE 2D 125	6.3 mm clips			
G092052	SI 6.32 LC PRE 2D 125	Clip upstr./Clamp downstr.			
N091989	SI 6.32 CC PRE 2D 250	Screw clamp	250V AC	5	40g
Y092021	SI 6.32 LL PRE 2D 250	6.3 mm clips			
H092053	SI 6.32 LC PRE 2D 250	Clip upstr./Clamp downstr.			

Mounting: Directly screwed on base or snapped on DIN-rail an adaptation (refer to accessories).

Fuse holders and fuse disconnectors SI 6.32

DISCONNECTORS WITH AUXILLIARY CONTACT INDICATION



Ref. Number	Catalog Number	Connecting	Packaging	Unit weight
T092109	SI 6.32 LL PRE+MC 2,5	6.3 mm clip.	5	45g
P092335	SI 6.32 LC PRE+MC 2,5	Upstream clips and downstream screw clamp	5	45g

Impossible for SI 6.32 CC PRE type disconnector.
Mounting: Directly screwed on base or snapped on DIN-rail an adaptation (refer to accessories).

DISCONNECTORS WITH NEUTRAL DUMMY FUSES



Ref. Number	Catalog Number	Connecting	Packaging	Unit weight
W092088	SI 6.32 CC PRE + Neutre	Screw clamp	10	45g
X092089	SI 6.32 LL PRE + Neutre	6.3 mm clip	10	45g
X085879	SI 6.32 LC PRE + Neutre	Upstream clips and downstream screw clamp	10	45g

Mounting: Directly screwed on base or snapped on DIN-rail adaptation (refer to accessories).
* 6 x 32 neutral dummy fuse Ref. Number : H 047594.

ACCESSORIES

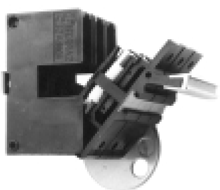
COUPLING STRIPS FOR 2, 3 AND 4-POLE MODEL MOUNTING



Ref. Number	Catalog Number	Packaging	Unit weight
F091867	PROFILE SII 6 X 32 PRE	10	2,5g
G091868	PROFILE SIII 6 X 32 PRE	10	2,5g
H091869	PROFILE SIV 6 X 32 PRE	10	2,5g

Mounting : For slipping on grips. Marking can be slipped on the strip.

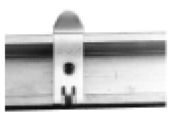
OFF-POSITION PADLOCKING DEVICES FOR 1, 2, 3 AND 4-POLE MODELS



Ref. Number	Catalog Number	Packaging	Unit weight
B092070	DISPOSITIF CAD SI 6 X 32 PRE	5	38g

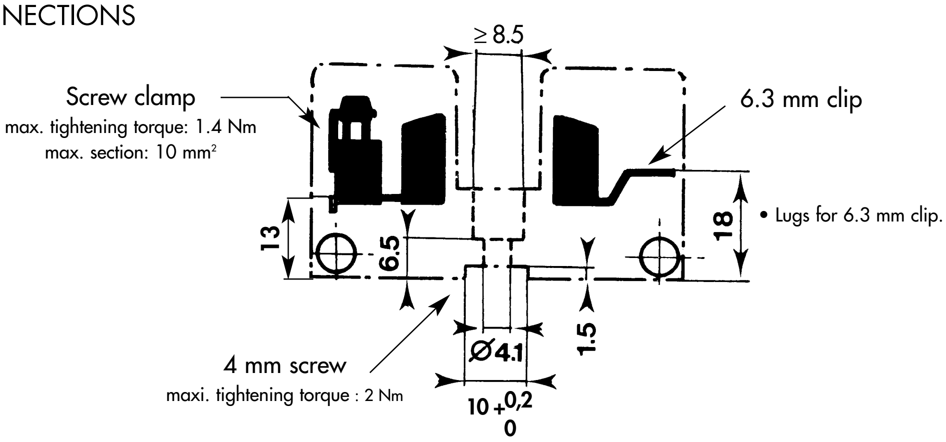
Only one device to be cut according to the number of poles (pre-cut in factory).
Padlocking in off-position by 3 dia. 8mm padlocks.

FIXING ADAPTERS FOR DIN-RAIL MOUNTING

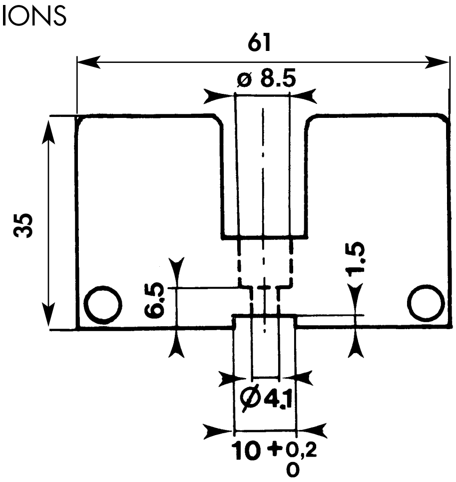
	Rail type	Ref. Number	Catalog Number	Packaging	Unit weight
	DIN symmetrical EN 50022	B092093	FIXOMEGA FM4	10	4,5g
	DIN asymmetrical EN 50035	K092046J K092046Q	EF 46	10 100	4g

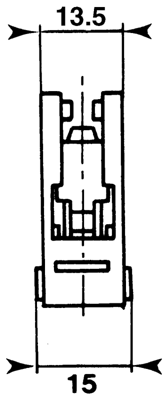
Fuse holders and fuse disconnectors SI 6.32

CONNECTIONS

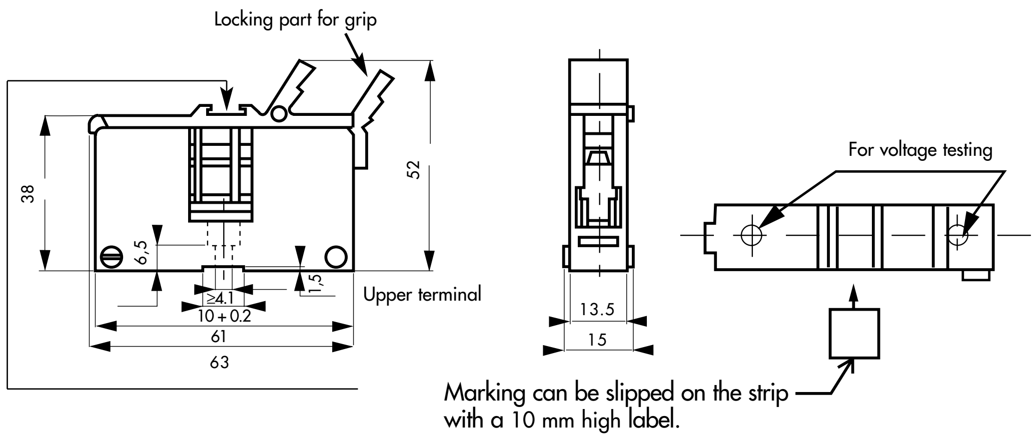


HOLDER DIMENSIONS

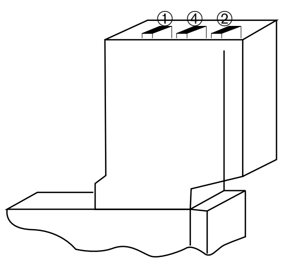


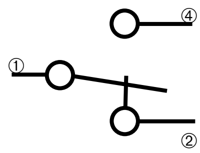


DISCONNECTOR DIMENSIONS



CONNECTING AUXILLIARY BLOWN-FUSE MICROSWITCH





Connection:
Soldering or 2.8 mm clips

Form 101 Fuse Blocks — P243, P266, P292



FUSE BLOCKS FOR SEMICONDUCTOR FUSES

Ferraz Shawmut P243 and P266 series fuse blocks for Form 101 fuses are glass-filled polycarbonate or laminated phenolic insulator blocks with studs to accommodate bolt-in fuses. The P292 series has a laminated phenolic insulator base with fuse clips. All studs, clips and mounting hardware are tin or zinc plated.

Ratings

- ✔ 1 to 900A
- ✔ **Clip Type:** 1200VAC or less

  Stud Type: 1000VAC or less

Approvals

- ✔ UL Recognized Component Guide IZLT2 File E52283

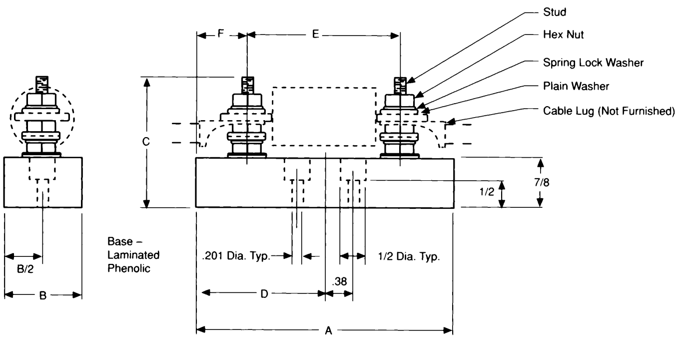


Figure 1

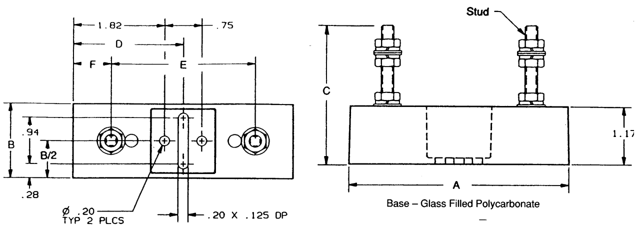


Figure 2

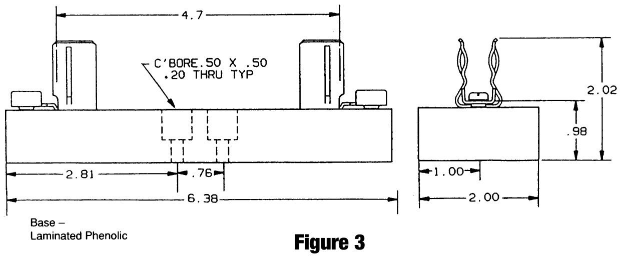


Figure 3

Dimensions

FOR USE WITH	AMPERES	CATALOG NUMBER	REFERENCE NUMBER	DIMENSIONS - INCHES							STUD SIZE	STUD TORQUE in - lb
				FIG.	A	B	C	D	E	F		
A13X	70-450	P243D	C219560	2	4.40	1.50	2.79	2.20	2.06	1.17	1/4-20	36
A13X	500-600	P243G	H222762	2	4.40	1.50	2.79	2.20	2.44	0.98	5/16-18	84
A25X, A25Z	35-60	P243G	H222762	2	4.40	1.50	2.79	2.20	2.44	0.98	5/16-18	84
A25X, A25Z	70-200	P243	T218517	1	4.50	1.50	2.50	2.25	2.38	1.06	1/4-20	36
A25X, A25Z	225-600	P243G	H222762	2	4.40	1.50	2.79	2.20	2.44	0.98	5/16-18	84
A50P	35-60	P243G	H222762	2	4.40	1.50	2.79	2.20	2.44	0.98	5/16-18	84
A50P, A50QS	70-200	P243E	X222016	2	4.40	1.50	2.79	2.20	2.88	0.76	1/4-20	36
A50P, A50QS	225-600	P266C	K212897	1	6.00	2.00	3.00	3.00	3.28	1.36	3/8-16	144
A60X, A60Z, A70QS	35-200	P243C	M219040	2	4.40	1.50	2.79	2.20	3.62	0.39	1/4-20	36
A60X, A60Z	225-600	P266A	Y212380	1	6.00	2.00	3.00	3.00	4.06	0.97	3/8-16	144
A70P, A70Q	35-100	P243C	M219040	2	4.40	1.50	2.79	2.20	3.62	0.39	1/4-20	36
A70P, A70Q	125-400	P266A	Y212380	1	6.00	2.00	3.00	3.00	4.06	0.97	3/8-16	144
A70P, A70Q	450-600	P266F	S213410	1	8.00	2.50	3.00	4.00	5.09	1.45	3/8-16	144
A100P	35-100	P266G	Z214428	1	6.00	2.00	2.50	3.00	4.25	0.88	1/4-20	36
A100P	125-400	P266L	J215955	1	6.00	2.00	3.00	3.00	4.66	0.67	3/8-16	144
A120X	1-30	P292	T216976	3	-	-	-	-	-	-	-	-

Ferrule fuse holders and fuse disconnectors ST27

ST FUSE - DISCONNECTORS
FOR 27x60 FERRULE-TYPE FUSES
UR - gR CLASSES

- IN ACCORDANCE WITH
  UL 512 AND UL 840
  CSA 22-2 N° 39
  EN 60947-1 & 3 (OPERATION CLASS: AC20B)

- COMPLETE PROTECTION AGAINST LIVE PART TOUCHING
  PROTECTION DEGREE: IP 2XB AS PER EN 60529

- HIGH-PERFORMANCE ST RANGE COMPLIANT WITH EUROPEAN VOLTAGE RATINGS
  (FIXING ON DIN RAIL - MODULAR FUSE-DISCONNECTOR)



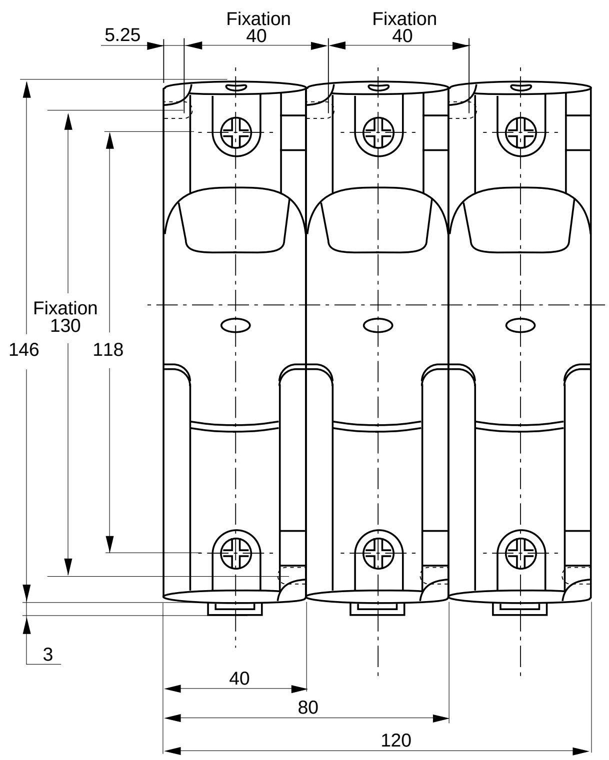
MAIN CHARACTERISTICS

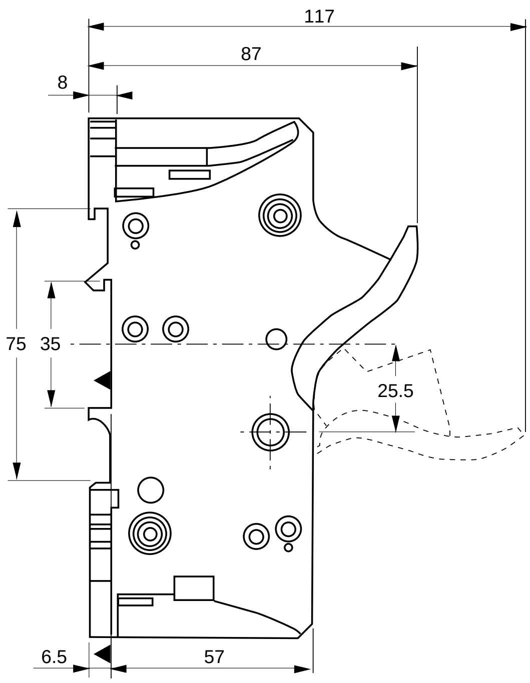
Size	AC Insulation voltage rating Ui in V AC/DC	Impulse withstand voltage Uimp (kV)(1)	Current rating I_N(A)	Fuse current rating I_N(A)	Maximum fuse operating current (A)				Recommended copper wire gauge		Approvals
					660V URGD	660V URQ-URS	CC660V -800VgRB	1000V URB	AWG gauge	mm2	
ST 27	800 (CEI) 800 (US)	8	150	8 to 25	WITHOUT DERATING				18 to 12	1 to 4	cULus Pending
				32	32	32	32	29	10	6	
				40	40	40	40	36	8	10	
				50	50	45	50	42	8	10	
				63	55	55	63	50	6	16	
				80	61	60	80	60	6	16	
				100	75	72	96	72	4	25	
				110	—	—	102	—	3	30	
				125	91	90		90	3	35	
				160	112	110		109	3	35	
				170	—	—		112	3	35	
				200	130	130			1	50	
				250	138	138			1	50	

All terminals silver-plated copper

Ferrule fuse holders and fuse disconnectors ST27

ST 27 for Protistor® 27x60 (gR-UR)





Qty. of poles	Symbol	Catalog Number	Reference Number	Weight (g)	Packaging
1		ST27gR-UR	R 210580	270	3
1+N		ST27gR-UR I+N	S 210581	610	1
N		ST27 N	B 210152	340	3
2		ST27gR-UR II	T 210582	540	1
3		ST27gR-UR III	V 210583	710	1
3+N		ST27gR-UR III+N	W 210584	1050	1

Connection by fixed screw clamp-type connections for wires:
Maximal section:
•One conductor, multistrand or rigid wire: 35 mm ^{2} (3AWG)
• Two conductors, multistrand wire: 16 mm^2 (6AWG)or rigid wire 25 mm^2 (4AWG)
Minimal section: 2.5 mm^2 (14AWG)
with tightening torque : 2.8 to 3.5 Nm (30 lb.in)
• Connecting for ready-to-connect with eye lug wires (type B).
Mounting:
•simple snap mounting on 35mm normalized symmetrical DIN-rail (EN 50022)) and 75 mm with 2 positions lock.
• direct on board with a M4 screw with tightening torque1 to 1.2 Nm (11 lb.in)
Indicating light: available in 2000.

Options: Models with preisolating and blown fuse indication available at the end of 2000; models with padlocking and side handle available in 2001.

Semiconductor Fuses

Ferrule fuse holders and disconnectors PS 27x60

FUSE HOLDERS AND FUSE DISCONNECTORS FOR FERRULE-TYPE FUSES

- SOLID ASSEMBLY OFFERING GOOD THERMAL AND MECHANICAL WITHSTANDS
- FUSE MOUNTING IN HOLDERS OR DISCONNECTORS WITH OR WITHOUT PREISOLATING AND BLOWN-FUSE INDICATING MICROSWITCHES
- PHENOLIC RESIN MODELS FOR BASIC APPLICATIONS - FIBER GLASS POLYESTER FOR APPLICATIONS IN CORROSIVE ATMOSPHERES OR IN TRACTION
- COMPLYING WITH IEC 947-3 STANDARD (AC 20 A CLASS)
- Ui = 1,000 V AC - 1,250 V DC



MAIN CHARACTERISTICS

Catalog Number	Insulation voltage rating Ui AC 50/60 Hz or DC	Fuse current rating I_N(A)	Maximum operating current of fuse (A) =440 V gLB	=660 V gRB	~1000 V URB	~660 V URGD	660 V URQ	Recommended copper wire size mm²	Fire and fumes class NF F 16 - 101 and 102 and UL
PSI 27x60		110							
PSII 27x60		125						50	basic model
PSIII 27x60	1000 V AC				no operating limit				I2-F1
PSIV 27x60	1250 V DC	160						70	UL 94 V1
PSI 27x60 PRE	with or without terminal covers	170							salt spray-proof model
PSII 27x60 PRE		200				190	200	95	I1-F1
PSIII 27x60 PRE						225	225		UL 94 V0
PSIV 27x60 PRE		250						120	

Connecting with two screws M8 (maximum tightenning torque 13.5 mN) on silver plated terminals the 95 mm² max. cable with copper terminals or with 20 x 8 max. rigid or flexible bar

Dielectric withstand tests

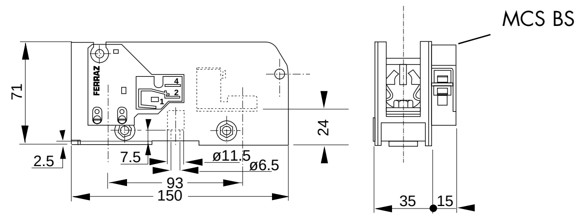
	R.M.S. voltage 1 mn 50/60 Hz	Impulse voltage 1.2/50 µs (IEC694 et CEI 60)
Between close phases and phase and mass	9 kV	12 kV
Between phases and microswitch	14 kV	

Basic model
Max. temperature (°C)/ Relative humidity (%): 20 °C/95% - 40°C/80% - 50°C/50%

Salt spray-proof model
Moist tropical and equatorial climate. Corrosive atmosphere.

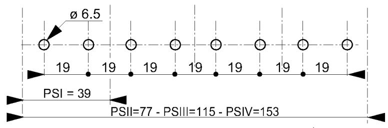
Ferrule fuse holders and disconnectors PS 27x60

FUSE HOLDERS AND ACCESSORIES

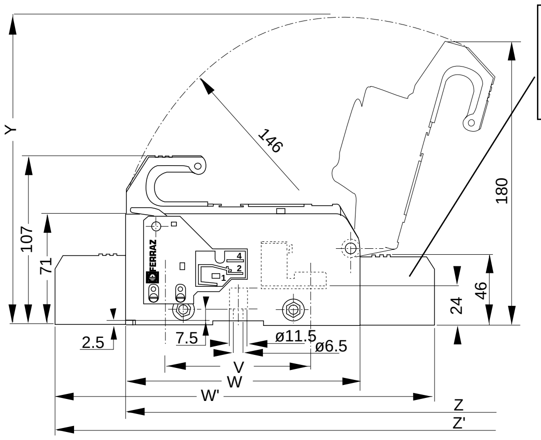


Catalog Number	Ref. Number	Weight (g)	Packaging
PSI 27x60	B 220088	300	3 pieces
PSII 27x60	C 220089	560	2 pieces
PSIII 27x60	D 220090	920	1 piece
PSIV 27x60	E 220091	1150	1 piece
PSI 27x60+MCS BS	R 220240	330	2 pieces
PSII 27x60+MCS BS	S 220632	600	2 pieces
PSIII 27x60+MCS BS	P 220215	900	1 piece
PSIV 27x60+MCS BS	S 220356	1200	1 piece

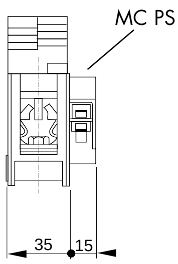
Mounting : Direct on board or bar with two M8 screws - see below drilling diagram

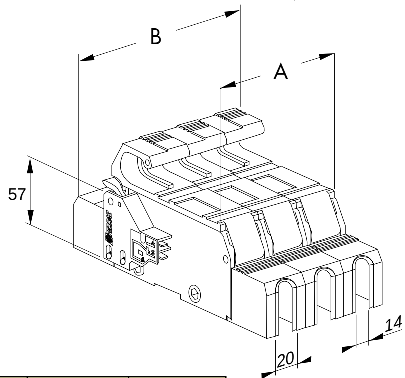


FUSE DISCONNECTORS AND ACCESSORIES



Twin terminal covers
PS 27
Part #: A 220087
Weight: 30g
Packaging: 3 twins





V: 93 Connecting distance between centers
W: 150 Without terminals cover length
W': 240 With terminals cover length
Y: 196 Space factor with a 90° fuse carrier position
Z: 284 Without terminal cover, space factor with a 180° fuse carrier position
Z': 279 With terminal cover, space factor with a 180° fuse carrier position

Quantity of poles	A	B
1	39	53
2	77	91
3	115	129
4	153	167

Catalog Number (basic model)	Ref. Number	Weight (g)	Packaging
PSI 27x60 PRE	H 220071	400	3 pieces
PSII 27x60 PRE	J 220072	800	2 pieces
PSIII 27x60 PRE	K 220073	1300	1 piece
PSIV 27x60 PRE	L 220074	1700	1 piece
PSI 27x60 PRE+MC PS	M 220075	500	2 pieces
PSII 27x60 PRE+MC PS	N 220076	900	2 pieces
PSIII 27x60 PRE+MC PS	P 220077	1400	1 piece
PSIV 27x60 PRE+MC PS	Q 220078	1800	1 piece

Catalog Number (salt spray-proof model)	Ref. Number	Weight (g)	Packaging
PSI 27x60 PRE BS	R 220079	500	3 pieces
PSII 27x60 PRE BS	S 220080	1030	2 pieces
PSIII 27x60 PRE BS	T 220081	1540	1 piece
PSIV 27x60 PRE BS	V 220082	2080	1 piece
PSI 27x60 PRE BS+MC PS	W 220083	540	2 pieces
PSII 27x60 PRE BS+MC PS	X 220084	1100	2 pieces
PSIII 27x60 PRE BS+MC PS	Y 220085	1600	1 piece
PSIV 27x60 PRE BS+MC PS	Z 220086	2100	1 piece

Preisolating and blown fuse indicating microswitch features	
Microswitch rated current	Non-inductive circuit interrupting rating
3A - 50 Hz	3A - 250V
3A - DC	3A - 30V 0.5A - 110V

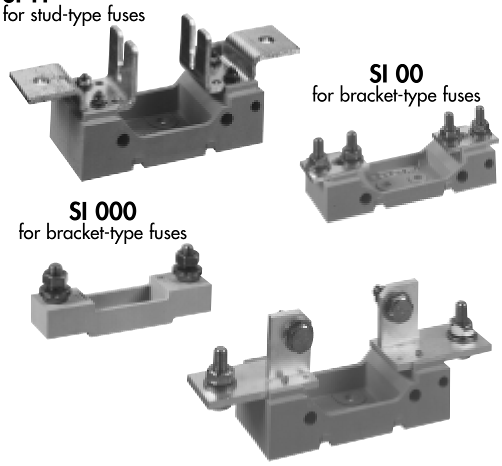
Reliable minimum operating voltage/current : 10V - 10mA

Connecting with 6.35 mm lug

Square-body Fuse Bases SI

SI FUSEHOLDERS
- FOR STUD-TYPE FUSES
- FOR BLADE-TYPE FUSES SI 00 AND SI 000
- FOR BRACKET-TYPE FUSES SI DIN 80 AND DIN 110

- MOUNTING IN ONE-POLE FUSEHOLDER SIMPLIFIES FUSE REPLACEMENT FOR INSTALLATIONS CONNECTED WITH CABLES AND BARS
- FOR TTF STUD-TYPE FUSES
  FOR BLADE AND BRACKET-TYPE FUSES AS PER DIN 43653 STANDARD
  SIZES: 000 - 00, 80 MM BETWEEN AXES
  SIZES: 0 - 1 - 2 - 3, 80 AND 110 MM BETWEEN AXES



MAIN CHARACTERISTICS

Catalog Number and sizes	Insulation voltage Ui (AC 50/60 Hz & DC)	Current	Maximum power* (W)	Dielectric withstand test		Fire and fumes class
				RMS voltage 1 mn 50/60 Hz	Impulse voltage 1.2/50µs	
SI TT 30/31	1500 V	1000 A	53 - 75	10 kV	12 kV	UL 94 VO I_1 F_1 (NF 16102)
SI TT 70/71	1500 V	1000 A	53 - 75	10 kV	12 kV	
SI TT 32/33	1500 V	2500 A	100	10 kV	12 kV	
SI TT 72/73	1500 V	2500 A	100	10 kV	12 kV	
SI 000 DIN 80	700 V	400 A	24	7 kV	8 kV	UL 94 VO
SI 00 DIN 80	700 V	400 A	28	8 kV	12 kV	UL 94 VO - I_3 F_3 (NF 16102)
SI DIN 80 630 (30 to 33)	1500 V	2500 A	95	10 kV	12 kV	UL 94 VO I_1 F_1 (NF 16102)
SI DIN 110 630 (30 to 33 - 70 to 73)	1500 V	2500 A	95	10 kV	12 kV	
SI DIN 80 1250 (30 to 33)	1500 V	2500 A	110	10 kV	12 kV	
SI DIN 110 1250 (30 to 33 - 70 to 73)	1500 V	2500 A	110	10 kV	12 kV	

Vibration withstand:
Tests with sine vibrations carried out at ambient with scanning each of the three main axes of the holder.
Spectrum: 1st segment (2 to 16 Hz) constant trip x = 5 mm peak.
2nd segment (16 to 250 Hz) constant acceleration γ = 5 g peak.
Exponential scanning speed: 1 octave per minute.
Duration: 2 hours per axis.

Square-body Fuse Bases SI

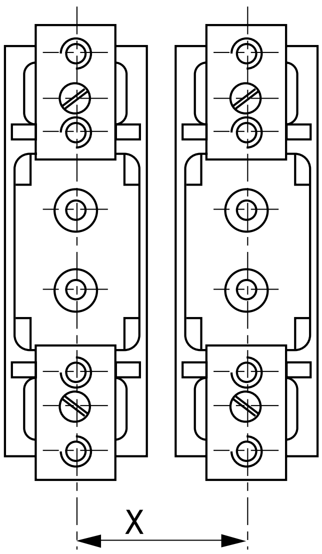
References

Catalog Number	Ref. Number	Weight (g)	Packaging
SI TT 30/31	B 301232	1 960	1
SI TT 70/71	C 301233	1 960	1
SI TT 32/33	D 301234	2 900	1
SI TT 72/73	E 301235	2 900	1
SI 000 DIN 80	C 220710	90	12
SI 00 DIN 80	Q 098040	205	3
C - CLO*	M 091344	37	2
SI DIN 80 630	L 098772	625	1
SI DIN 110 630	F 098031	625	1
SI DIN 80 1250	F 098560	885	1
SI DIN 110 1250	L 091941	885	1

* Necessary for SI 00 DIN 80 one-pole mounting.

DISTANCE "X" BETWEEN POLE AXES (WITHOUT PARTITION)

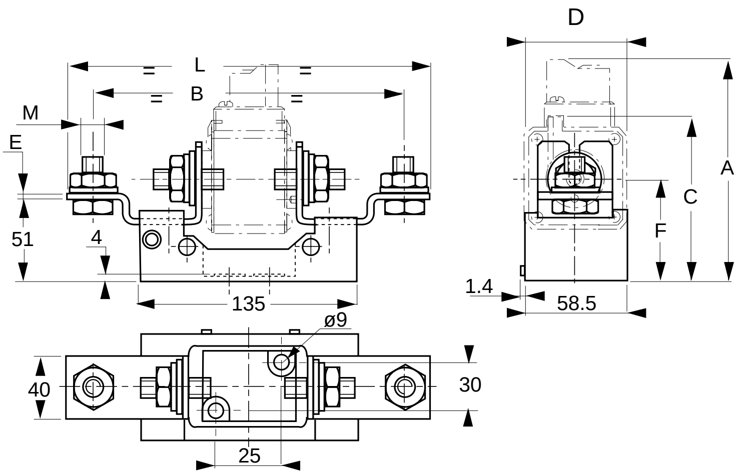
Catalog Number	Fuses sizes	Operating voltage U				
		400V	550V	690V	1000 V	1250 V
SI TT 30/31 SI TT 70/71	30 - 31 70 - 71	58,5	61	65	71	76
SI TT 32/33 SI TT 72/73	32 - 33 72 - 73	79,5	84,5	88,5	94,5	99,5
SI 000 DIN 80 SI 00 DIN 80	000 00	25 46,5	35 46,5	39 46,5	45 50	50 55
SI DIN 80 630/1250	30 - 31 32 - 33	58,5 79,5	61 84,5	65 88,5	71 94,5	76 99,5
SI DIN 110 630/1250	30 - 31 - 70 - 71 32 - 33 72 - 73	58,5 79,5	61 84,5	65 88,5	71 94,5	76 99,5



Square-body Fuse Bases SI

CONNECTION DIMENSIONS

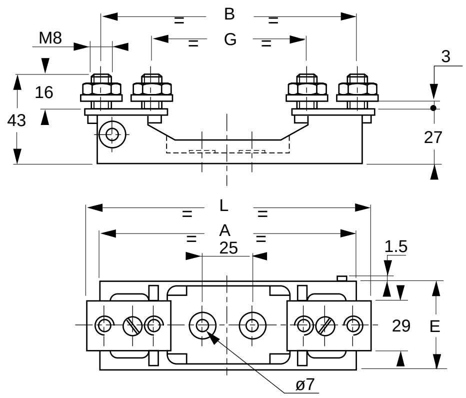
SI TT



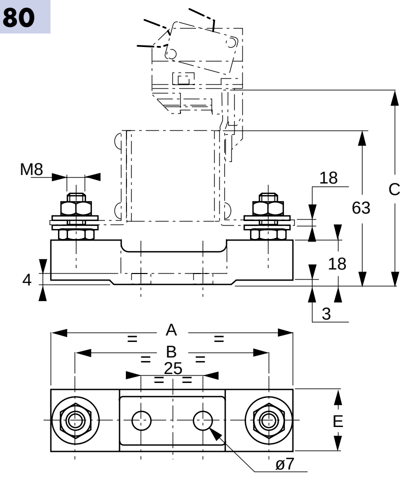
Catalog Number	A	B	C	D	E	G	L	M	F
SI TT 30/31	118(30) 123(31)	170	83 (30) 88 (31)	42(30) 51(31)	4	50,6	202	M8	57
SI TT 70/71	118(70) 123(71)	193	83 (70) 88 (71)	42(70) 51(71)	4	74	225	M8	67
SI TT 32/33	137(32) 145(33)	170	93 (32) 109 (33)	60(32) 75(33)	6	50,6	202	M10 (32) M12 (33)	57
SI TT 72/73	137(72) 145(73)	193	93 (72) 109 (73)	60(72) 75(73)	6	71	225	M10 (32) M12 (33)	67

Partition mounting not possible. Panel drilling: 25x30 mm

SI 00 DIN 80



SI 000 DIN 80



Catalog Number	A	B	C	D	E	G	L	Fuse sizes
SI 000 DIN 80	100	80	80	19	25	80	100	000-17x49-27x60 DIN 80
SI 00 DIN 80	133	130			46.5	79	148	00-27x60 DIN 80

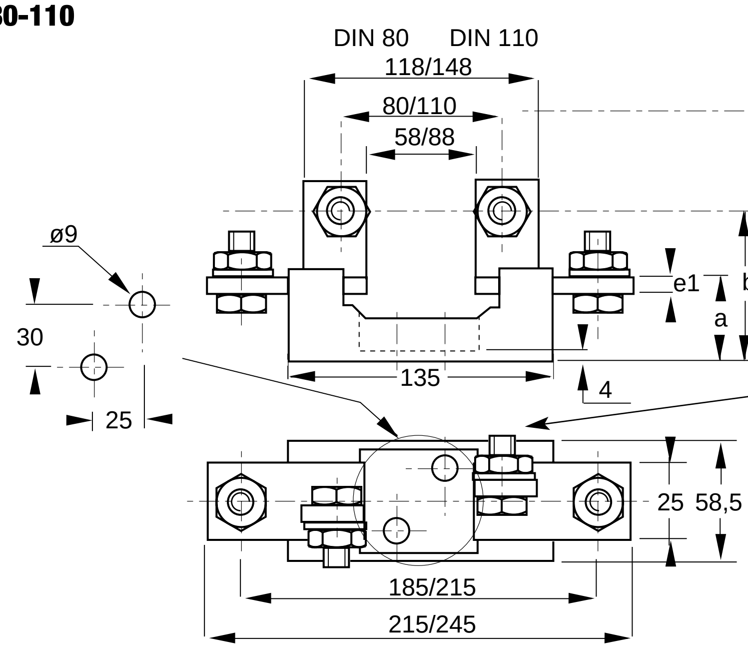
Partition mounting only for SI 00 DIN 80

* Electrical connection of fuse and fuse holder via supplied studs, nuts and washers
Maximum recommended tightening torque: 13.5 Nm for M8 screws.
26 Nm for M10 screws.
46 Nm for M12 screws.

- Fixing of base on plate or bar via screws not supplied.
M6 for SI 000 and SI 00 Tightening torque 7 ± 15 Nm.
M8 for SI TT Tightening torque 10 ± 2 Nm.

Square-body Fuse Bases SI

SI DIN 80-110



Note: Screws for fixing fuse on holder do not jut out above or modify insulation distance when fuse connected.

Catalog Number	a	e1	b	C	Fuse size
SI DIN 80 630	40	5	68	93.5 99.0 103.5 110.3	30 D08..... 31 D08..... 32 D08..... 33 D08.....
SI DIN 110 630	40	5	68	93.5 99.0 103.5 110.3	30-70 D11..... 31-71 D11..... 32-72 D11..... 33-73 D11.....
SI DIN 80 1 250	45	10	73	98.5 104 108.5 115.3	30 D08..... 31 D08..... 32 D08..... 33 D08.....
SI DIN 110 1 250	45	10	73	98.5 104 108.5 115.3	30-70 D11..... 31-71 D11..... 32-72 D11..... 33-73 D11.....

Partition mounting impossible

* Electrical connection of fuse and wires by M10x30 screws made in plated steel minimum 8-8 class.
  Screws included.
  Maximum recommended tightening torque: 44 $^{+0}_{-8}$ Nm for M10 screw.

- Fixing of base with screws not supplied: M8. Tightening torque 10 ± 2 Nm.

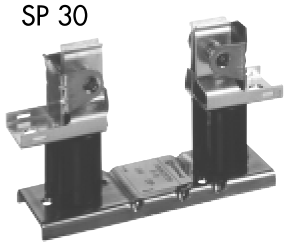
Square-body Fuse Bases

SP SE SF

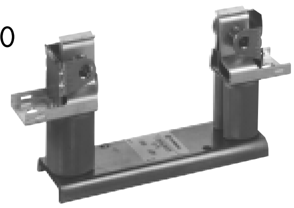
SP - SE - SF FUSEHOLDERS
FOR "E" BLADE-TYPE FUSES

- MOUNTING IN ONE-POLE FUSEHOLDER SIMPLIFIES REPLACEMENT OF FUSES FOR INSTALLATIONS CONNECTED WITH CABLES AND BARS
- FOR "E" BLADE-TYPE FUSES
  - ELASTIC TIGHTENING FOR SIZES 0 TO 2
  - BOLTED TIGHTENING FOR SIZE 3

SP 30



SP 70



MAIN CHARACTERISTICS

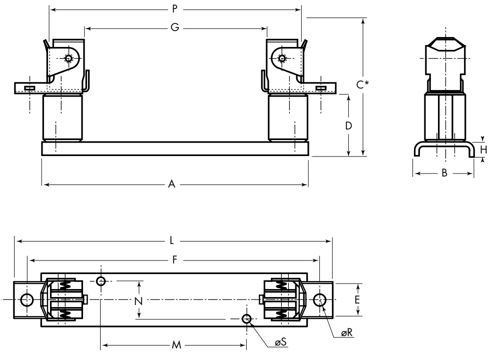
Catalog Number	Insulation voltage Ui (AC 50/60 Hz & DC)	Current	Maximum power* (W)	Dielectric withstand test	
				RMS voltage 1 mn 50/60 Hz	Impulse voltage 1.2/50µs
SP 30	1 250 V	550 A	31	13 kV	20 kV
SP 70	1 500 V	630 A	31	13 kV	20 kV
SP 36 120	2 500 V	200 A		13 kV	20 kV
SP 85 200	7 200 V	160 A		34 kV	40 kV
SE 31	1 250 V	800 A	59	13 kV	20 kV
SE 32	1 250 V	1 800 A	95	13 kV	20 kV
SE 71	1 500 V	1 000 A	59	13 kV	20 kV
SE 72	1 500 V	1 250 A	95	13 kV	20 kV
SE 91	2 000 V	350 A		13 kV	20 kV
SE 92	2 000 V	500 A		13 kV	20 kV
SE 121	2 500 V	315 A		13 kV	20 kV
SE 122	2 500 V	500 A		13 kV	20 kV
SF 50-33	3 200 V	2 500 A	110	24 kV	20 kV
SF 50-73	3 200 V	1 800 A	110	24 kV	20 kV
SF 50-93	3 200 V	1 800 A		24 kV	20 kV
SF 50-123	3 200 V	1 800 A		24 kV	20 kV

Square-body Fuse Bases

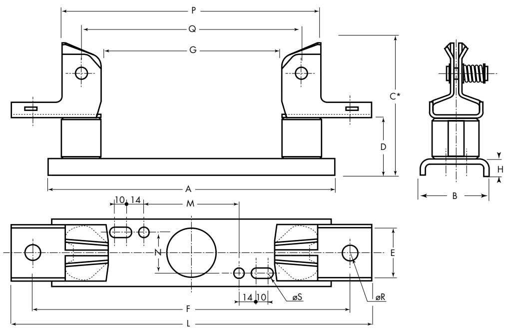
SP SE SF

DIMENSIONS

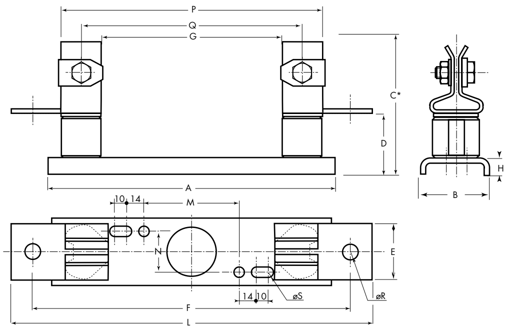
Drawing #1
"SP" elastic tightening



Drawing #2
"SE" elastic tightening



Drawing #3
"SF" bolted tightening



NB: For SF 50-33 types fixing dimension 14 becomes 12.5

Catalog Number	Drawing #	A	B	C*	D	E	F	G	H	L	M	N	P	Q	Ø R	Ø S
SP 30	1	138	42	109	46	26	134.5	54.5	8.5	155	52	28	98.5		8.5	5.5
SP 70	1	148	42	110.5	47.5	26	168	88	10	188	60	28	138		8.5	5.5
SP 36 120	1	194.5	42	110.5	47.5	26	214.5	134.5	10	234.5	106.5	28	184		8.5	5.5
SP 85 200	1	292	54	173	86.5	26	276	196	15	296	155	35	240		8.5	8.5
SE 31	2	148	42	116	46.5	32	158.5	61.5	8.5	190.5	60	28	111.5	86.6	10.5	5.5
SE 32	2	150	54	126	49	42	180	56	10	216	45	35	126	91	12.5	8.5
SE 71	2	148	42	116	46.5	32	182	85	8.5	214	60	28	135	110	10.5	5.5
SE 72	2	150	54	126	49	42	204	80	10	240	45	35	150	115	12.5	8.5
SE 91	2	174	42	116	48	32	209	111	10	241	86	28	161	136	10.5	5.5
SE 92	2	176	54	126	50	42	230	106	15	266	23	35	176	141	12.5	8.5
SE 121	2	204.5	42	116	48	32	238.5	141.5	10	270.5	116.5	28	191.5	166.5	10.5	5.5
SE 122	2	230.5	54	126	54	42	260.5	136.5	15	296.5	77.5	35	206.5	171.5	12.5	8.5
SF 50-33	3	150	60	171	65	40	186	56	15	226	NBfig.3	35	126	91	18	8.5
SF50-73	3	174	60	171	65	40	210	80	15	250	21	35	150	115	18	8.5
SF 50-93	3	200	60	176	70	40	236	106	15	276	47	35	176	141	18	8.5
SF 50-123	3	230.5	60	176	70	40	266.5	136.5	15	306.5	77.5	35	206.5	171.5	18	8.5

* Dimension for mounted fuse.

– Electrical connection of fuseholder and wires by screws made in plated steel 8-8 class (not supplied).

Maximum recommended tightening torque:
M8 : 22 $^{+0}_{-8}$ Nm
M12 : 76 $^{+0}_{-8}$ Nm
M16 : 100 $^{+0}_{-10}$ Nm

– Fixing of base with screws:
M5 (for sizes 0 and 1) : 7 ± 1,5 Nm
M8 (for sizes 2 and 3) : 22 $^{+0}_{-8}$ Nm

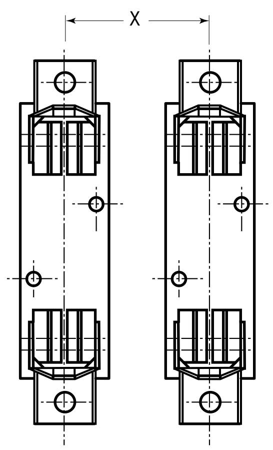
Square-body Fuse Bases SP SE SF

REFERENCES

Catalog Number	Ref. Number	Weight (g)	Packaging
SP 30	T 096939	370	1
SP 70	F 096099	400	1
SP 36 120	R 096937	500	1
SP 85 200	E 092487	1 100	1
SE 31	J 098701	435	1
SE 32	K 098702	900	1
SE 71	V 098711	470	1
SE 72	W 098712	940	1
SE 91	V 098734	955	1
SE 92	W 098735	955	1
SE 121	C 098741	540	1
SE 122	D 098742	1 026	1
SF 50-33	B 209186	1 550	1
SF 50-73	C 209187	1 590	1
SF 50-93	X 209090	1 625	1
SF 50-123	E 209091	1 720	1

DISTANCE "X" BETWEEN POLE AXES (WITHOUT PARTITION)

	Catalog Number	Operating voltage U						
		400 V	550 V	690 V	750 V	1 000 V	1 250 V	1 500 V
Without partition	SP 30 SP 70 SP 36 120 SP 85 200	45	50	54	55	60	65	68
	SE 31 SE 71 SE 91 SE 121	56	61	65	66	71	76	79
	SE 32 SE 72 SE 92 SE 122	65	70	74	75	80	85	88
	SF 50-33 SF 50-73 SF 50-93 SF 50-123	79,5	84,5	88,5	89,5	94,5	99,5	102,5



Ferrule fuse holders and disconnectors PS 20x127

FUSE HOLDERS AND FUSE DISCONNECTORS FOR FERRULE-TYPE FUSES 20x127

- SOLID ASSEMBLY OFFERING GOOD THERMAL AND MECHANICAL WITHSTANDS
- FUSE MOUNTING IN HOLDERS OR DISCONNECTORS WITH OR WITHOUT PREISOLATING AND BLOWN-FUSE INDICATING MICROSWITCHES
- PHENOLIC RESIN MODELS FOR BASIC APPLICATIONS FIBER-GLASS POLYESTER FOR APPLICATIONS IN CORROSIVE ATMOSPHERES OR IN TRACTION
- Ui = 1,500 V AND 2,500 V



MAIN CHARACTERISTICS

Catalog Number	Insulation voltage rating Ui AC 50/60 Hz or DC	Fuse current rating I_N (A)	Maximum operating current of fuse (A) 1000 V gLB	=1000 V gRC	~1000 V gRB	~1500 V gRB	~1500 V gRD	Advised copper wire size mm²	Fire and fumes class NF F 16 - 101 and 102 and UL
PSI 20x127	1500 V without terminal covers	50		50	no operating limit			10	basic model I2-F1 UL 94 V1
PSI 20x127 PRE		63		56				16	
PSII 20x127 PRE	2500 V with terminal covers and only salt spray -proof model	80	80					25	salt spray-proof model I1-F1 UL 94 V0
PSIII 20x127 PRE		100	90					35	
PSIV 20x127 PRE		125	100					50	

Connecting with 50 mm² max. cable with copper terminals or with a 15 x 8 max. rigid or flexible bar.

Dielectric withstand tests

	R.M.S. voltage 1 mn 50/60 Hz	Impulse voltage 1.2/50 µs (IEC 694 et CEI 60)
Between close phases and phase and mass	6kV(1) - 10 kV(2)	12 kV(1) - 20 kV(2)
Between phases and microswitch	12 kV	

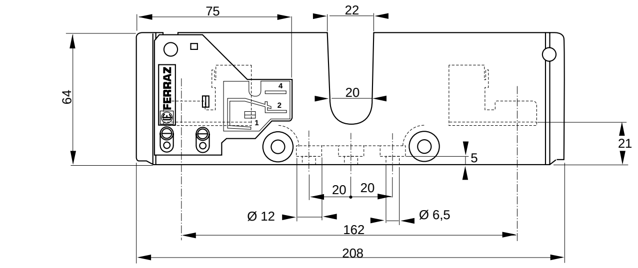
Connecting with 16mm max. width, 5mm max. thick terminal

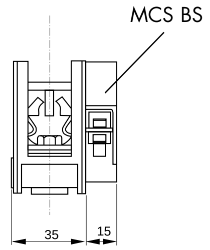
(1) Basic model
Max. temperature (°C)/ Relative humidity (%): 20 °C/95% - 40°C/80% - 50°C/50%
If Holder has to be kept off, and an heating system fed during stop periods must be used. Purpose is to keep the temperature of cubicle at a level just a little higher than outdoor temperature.

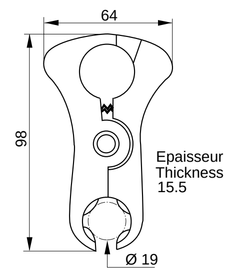
(2) Salt spray-proof model
Moist tropical and equatorial climate. Corrosive atmosphere.

Ferrule fuse holders and disconnectors PS 20x127

FUSE HOLDERS AND ACCESSORIES



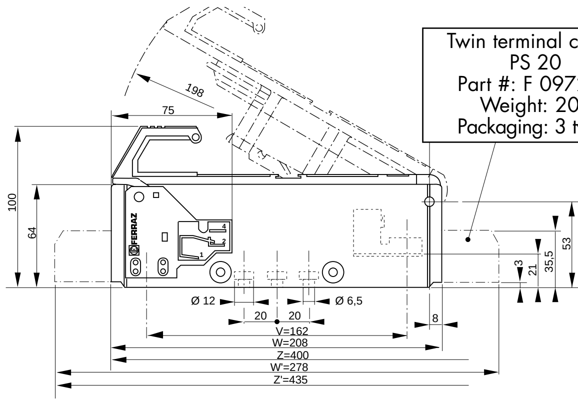




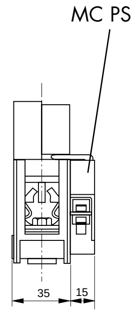
Catalog Number	Ref. Number	Weight (g)	Packaging
PSI 20x127 PSI 20x127+MCS BS	X 097310 X 220130	260 290	3 pieces 2 pieces

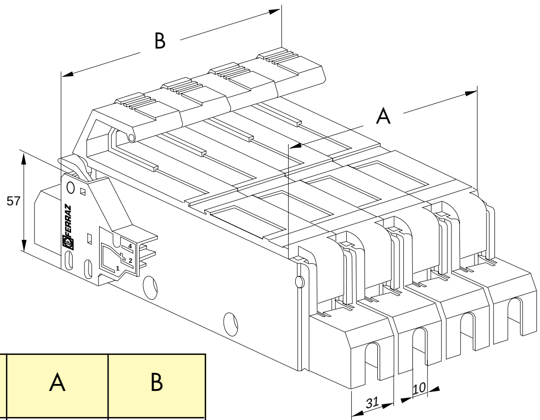
PMCP 20+22
Part #: K 100036
Weight: 40g
Packaging: 1

FUSE DISCONNECTORS AND ACCESSORIES



Twin terminal covers
PS 20
Part #: F 097226
Weight: 20g
Packaging: 3 twins





V: Connecting distance between centers
W: Without terminal cover length
W': With terminal cover length
Y: Space factor with a 90° fuse carrier position
Z: Without terminal cover, space factor with a 180° fuse carrier position
Z': With terminal cover, space factor with a 180° fuse carrier position

Quantity of poles	A	B
1	35	50
2	69	84
3	103	118
4	137	152

Catalog Number (basic model)	Ref. Number	Weight (g)	Packaging
PSI 20x127 PRE	F 097203	400	3 pieces
PSII 20x127 PRE	G 097227	800	2 pieces
PSIII 20x127 PRE	H 097228	1200	1 piece
PSIV 20x127 PRE	J 097229	1510	1 piece
PSI 20x127 PRE+MC PS	H 097205	430	2 pieces
PSII 20x127 PRE+MC PS	D 097293	880	2 pieces
PSIII 20x127 PRE+MC PS	E 097294	1200	1 piece
PSIV 20x127 PRE+MC PS	F 097295	1700	1 piece

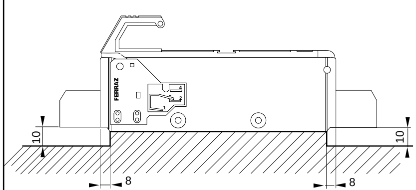
Preisolating and blown fuse indicating microswitch features	
Microswitch rated current	Non-inductive circuit interrupting rating
3A - 50 Hz	3A - 250V
3A - DC	3A - 30V 0.5A - 110V

Reliable minimum operating voltage/current : 10V - 10mA

Connecting with 6.35 mm lug

Catalog Number (salt spray-proof model)	Ref. Number	Weight (g)	Packaging
PSI 20x127 PRE BS	G 097204	490	3 pieces
PSII 20x127 PRE BS	L 097231	1000	2 pieces
PSIII 20x127 PRE BS	T 097261	1500	1 piece
PSIV 20x127 PRE BS	C 097292	1700	1 piece
PSI 20x127 PRE BS+MC PS	J 097206	520	2 pieces
PSII 20x127 PRE BS+MC PS	G 097296	1030	2 pieces
PSIII 20x127 PRE BS+MC PS	H 097297	1530	1 piece
PSIV 20x127 PRE BS+MC PS	J 097298	1730	1 piece

Distances when mounting on a conductive board @ Ui= 2500 VAC



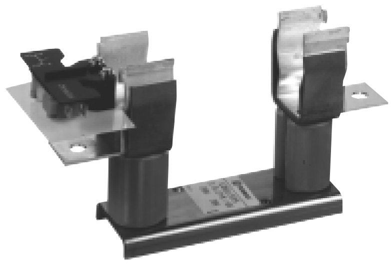
Semiconductor Fuses

Ferrule Fuse Base

SI 36x127

FUSE HOLDERS
FOR FERRULE-TYPE FUSES
36 x 127

- STURDY ASSEMBLY
  WITH VERY HIGH COLLISION WITHSTAND
- MOUNTING AS BASE
  WITH OR WITHOUT MICROSWITCH
- POLYESTER ISOLATORS
  FOR ALL APPLICATIONS



MAIN CHARACTERISTICS

Catalog number	Thermal current rating (Ith)*	Maximum power (W)	Insulation voltage Ui (AC 50/60 Hz & DC) (According to VDE 0110 : 565 - C group)	Dielectric withstand test RMS voltage 1 mn 50/60 Hz (1)	Dielectric withstand test Impulse voltage 1.2/50µs	Fire and fumes class
SI 36 x 127 BS SI 36 x 127 BS + MC 1-5 BS	200A	Fitted to FERRAZ SHAWMUT fuses	2 500 V	10 kV (1) phase-ground 9 kV phase-microswitch	kV phase-ground 20 kV phase-microswitch	I2 F1 NF 16102 UL 94-VO
				(1) Tests according to IEC 60 & 694 and NF C 64010 Dry atmosphere, new fuse holder		

Note: SI 36 x 127 BS fuse holder may be used for rolling stock.

Vibration withstand:

Tests with sine vibrations carried out at ambient, scanning each of the three main axes of the holder.

Spectrom: 1st segment (2 to 16 Hz) constant trip x = 5 mm peak.
2nd segment (16 to 250 Hz) constant acceleration γ = 5 g peak.

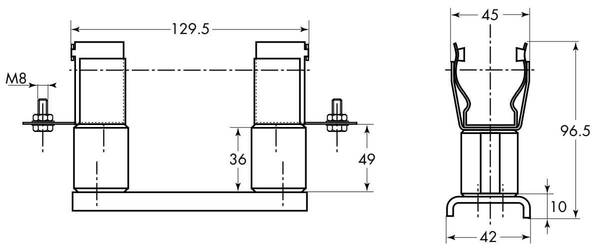
Exponential scanning speed: 1 octave per minute.

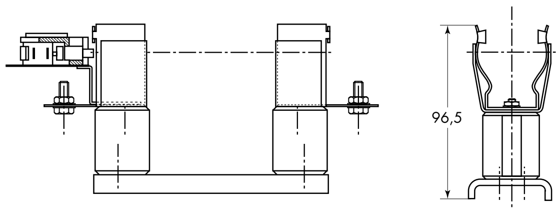
Duration: 2 hours per axis

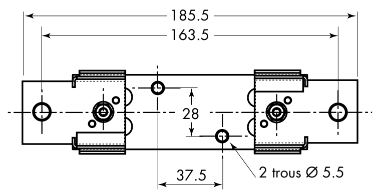
Ferrule Fuse Base SI 36x127

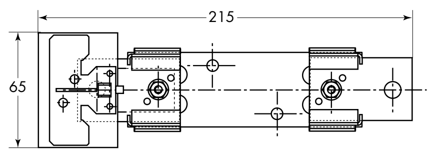
FUSE HOLDER AND ACCESSORY

Without microswitch **With microswitch**









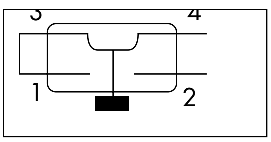
Catalog Number	Ref. Number	Weight (g)	Packaging
SI 36 127 BS	N 091920	406	1
SI 36 127 BS + MC 1-5 BS	E 091935	456	1

* Electrical connection of fuse holder and wires by screws made in plated steel 8-8 class (supplied with fuseholder).
Maximum recommended tightening torque: 22 $^{+0}_{-8}$ Nm for M8 screw.

- Fixing of base with M5 screws. Tightening torque 7±1,5 Nm.

MICROSWITCH CHARACTERISTICS

Microswitch current rating	Interrupting rating Non-inductive circuit
10 A - 50 Hz	7 A - 250 V
10 A - DC	10 A - 30 V 2,2 A - 110 V
Positive operating voltage/current : 20 V - 100 mA 6.35 mm slip on connector tags	



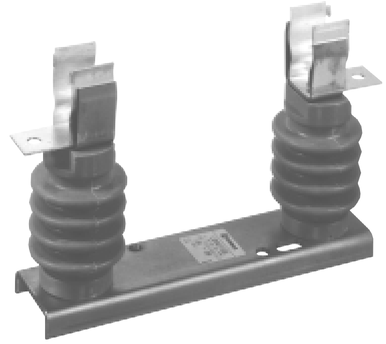
- With hand-made resetting reversing style microswitch
10A - 250V ~ with cos φ = 0.3
- #1 and 3 terminals must always be connected

Each microswitch weighs less than 100g, therefore no fume and smoke grade required by NF 16102 standard

Ferrule Fuse Base — SI 20.6 and 36

FUSE HOLDERS
FOR FERRULE-TYPE FUSES
20.6 x 190
36 x 190
36 x 250
36 x 400

- STURDY ASSEMBLY
  WITH VERY HIGH COLLISION WITHSTAND
- MOUNTING AS BASE
  WITH OR WITHOUT MICROSWITCH
- POLYESTER ISOLATORS
  FOR ALL APPLICATIONS



MAIN CHARACTERISTICS

Catalog Number	Thermal current rating (Ith)*	Insulation voltage Ui (AC 50/60 Hz & DC) (According to VDE 0110: 565 - C group)	Dielectric withstand test RMS voltage 1 mn 50/60 Hz	Dielectric withstand test Impulse voltage 1.2/50µs	Fire and fumes class
SI 85 - 20 - 190 SI 85 - 20 - 190 + MC 2R 1 - 5	50 A	7 200 V	27 kV phase-ground	60 kV phase-ground	F_1 M_2 NF 16102
SI 85 - 36 - 190 TRAC SI 85 - 36 - 190 + MC 2R 1 - 5	100 A	7 200 V			
SI 85 - 36 - 250	50 A	7 200 V	9 kV phase-microswitch		UL 94 VO
SI 85 - 36 - 400 TRAC	20 A	7 200 V			

Note: "TRAC" in catalog number means that fuse holder may be used for rolling stock with reinforced fixing of clips on isolators.
* No use limitation for FERRAZ SHAWMUT fuses mounted in the above holders.

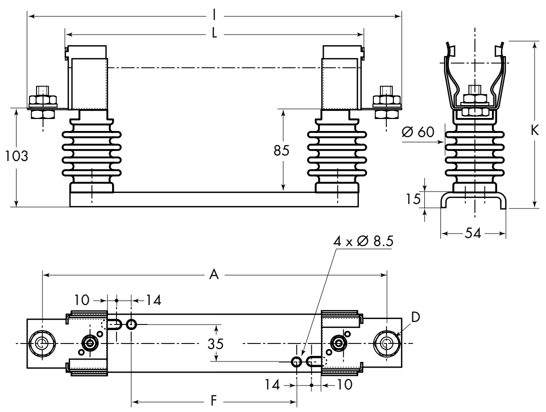
Vibration withstand:
Tests with sine vibrations carried out at ambiant with scanning each of the three main axis of the holder.
Spectrum: 1st segment (2 to 16 Hz) constant trip x = 5 mm peak.
2nd segment (16 to 250 Hz) constant acceleration γ = 5 g peak.
Exponential scanning speed: 1 octave per minute.
Duration: 2 hours per axis.

Semiconductor Fuses

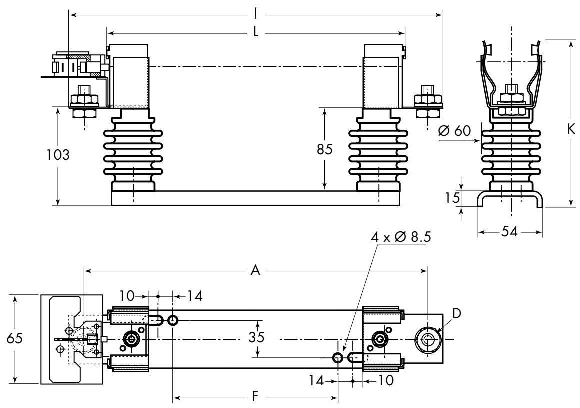
Ferrule Fuse Base SI 20.6 and 36

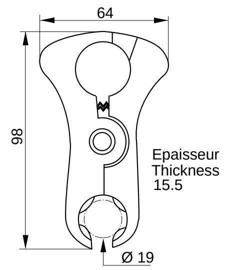
FUSEHOLDER AND ACCESSORY

Without microswitch



With microswitch





PMCP 20 + 22 for 20 x 190
Part #: K 100036
Weight: 40 g
Packaging: 1

Catalog Number	Ref. Number	Weight (g)	Packg.	Dimensions I	L	A	F	D	K
SI 85 20 x 190	Y 092665	950	1	241	192	223	73	6.5	131
SI 85 20 x 190 + MC 1-5	B 220525	1 050	1	288	192	223	73	6.5	
SI 85 36 x 190 TRAC	C 092738	1 080	1	250	194	228	73	8.5	150.5
SI 85 36 x 190 + MC 2R1-5	B 220617	1 180	1	299	194	228	73	8.5	
SI 85 36 x 250	P 092864	1 170	1	316	260	294	139	8.5	
SI 85 36 x 400 TRAC	D 092831	1 400	1	455	399	433	266	8.5	

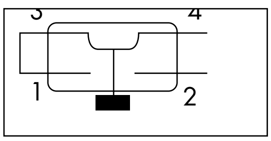
* Electrical connection of fuse holder and wires by screws made in plated steel 8-8 class (supplied with fuseholder).
maximum tightening torque advised: 22 $^{+0}_{-8}$ Nm for M8 screw. (SI 85 36x ...)

9 ± 2 Nm for M6 screw. (SI 85 20x ...)

- Fixing of base with M8 screws. Tightening torque 10 ± 2 Nm.

MICROSWITCH CHARACTERISTICS

Microswitch current rating	Interrupting rating Non-inductive circuit
10 A - 50 Hz	7 A - 250 V
10 A - DC	10 A - 30 V 2,2 A - 110 V
Positive operating voltage/current : 20 V - 100 mA 6.35 mm slip on connectors tags	



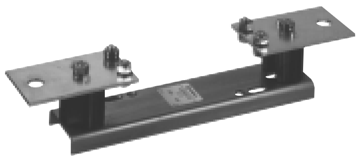
- With hand reset reversing-type microswitch 10A - 250V ~ with cos φ = 0.3
- #1 and 3 terminals must always be connected

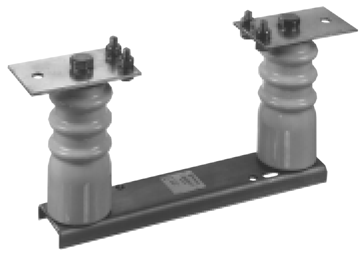
Each microswitch weighs less than 100g, therefore no fire and fumes grade is required by NF 16102 standard

Square-body Fuses SQ

FUSEHOLDERS
FOR BRACKET STYLE
CV3 FUSES

- MOUNTING IN ONE-POLE FUSEHOLDER SIMPLIFIES REPLACEMENT OF FUSES FOR INSTALLATIONS CONNECTED WITH CABLES AND BARS
- FOR BRACKET-TYPE FUSES BOLTED TIGHTENING
- "TRAC" MODELS WITH VERY HIGH COLLISION WITHSTAND FOR TRACTION COMPLYING WITH IEC 77 STANDARD





MAIN CHARACTERISTICS

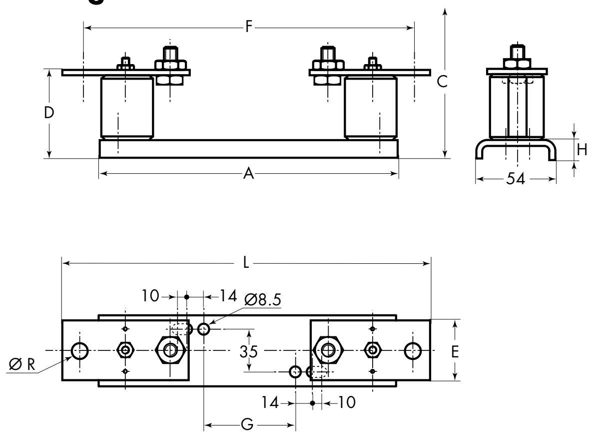
Catalog Number	Insulation voltage Ui (AC 50/60 Hz & DC)	Current (A)	Dielectric withstand test		Fire and fumes class
			RMS voltage 1 mn 50/60 Hz	Impulse voltage 1.2/50µs	
SQ 70	2 500	215	18 Kv	20 Kv	—
SQ 70 BS TRAC	2 500	215	18 Kv	20 Kv	F_1 M_2 (NF F16 102) - UL 94 VO
SQ 72	2 500	400	18 Kv	20 Kv	—
SQ 72 BS TRAC	2 500	400	18 Kv	20 Kv	F_1 M_2 (NF F16 102) - UL 94 VO
SQ 2 x 72	2 500	840	18 Kv	20 Kv	—
SQ 2 x 72 BS TRAC	2 500	840	18 Kv	20 Kv	Ceramic insulator
SQ 120	2 500	215	18 Kv	20 Kv	—
SQ 122	2 500	420	18 Kv	20 Kv	—
SQ 2 x 122	2 500	900	18 Kv	20 Kv	Ceramic insulator
SQ 85 300	7 200	180	34 Kv	40 Kv	F_1 M_2 (NF F16 102) - UL 94 VO
SQ 85 302	7 200	400	34 Kv	40 Kv	F_1 M_2 (NF F16 102) - UL 94 VO
SQ 120 2 x 302	7 200	400	34 Kv	40 Kv	Isolateur céramique
SQ 85 600	7 200	150	34 Kv	40 Kv	F_1 M_2 (NF F16 102) - UL 94 VO
SQ 85 602	7 200	375	34 Kv	40 Kv	F_1 M_2 (NF F16 102) - UL 94 VO
SQ 175 2 x 602	12 000	750	32 Kv	40 Kv	Ceramic insulator

No use limitation for FERRAZ SHAWMUT fuses mounted in the above holders.

Vibration withstand:
Tests with sine vibrations carried out at ambient with scanning each of the three main axes of the holder.
Spectrum: 1st segment (2 to 16 Hz) constant trip x = 5 mm peak.
2nd segment (16 to 250 Hz) constant acceleration γ = 5 g peak.
Exponential scanning speed: 1 octave per minute.
Duration: 2 hours per axis.

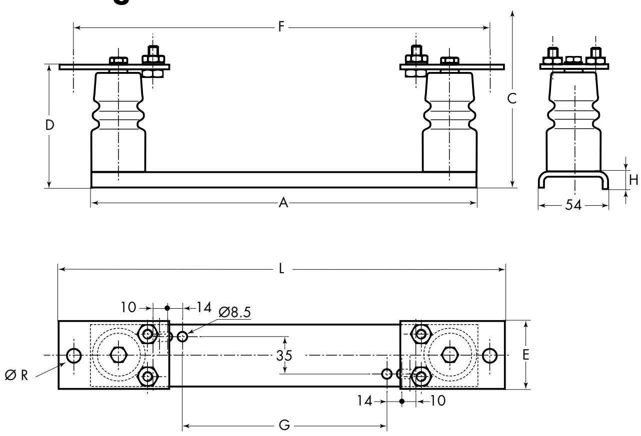
Square-body Fuses SQ

Drawing #1



Catalog Number	Ref. Number	Weight (g)	Packg.
SQ 70	G 098975	860	1
SQ 70 BS TRAC	M 221386	1040	1
SQ 72	H 098976	990	1
SQ 72 BS TRAC	T 098986	1065	1
SQ 120	K 098978	940	1
SQ 122	L 098979	1050	1
SQ 85 300	V 098481	1480	1
SQ 85 302	W 098482	1540	1
SQ 120 2 x 302	P 098982	2600	1
SQ 85 600	X 098483	1740	1
SQ 85 602	Y 098484	1935	1

Drawing #2



Catalog Number	Ref. Number	Weight (g)	Packg.
SQ 2 x 72	J 098977	2420	1
SQ 2 x 72 BS TRAC	X 098989	2640	1
SQ 2 x 122	M 098980	2500	1
SQ 175 2 x 602	Q 092244	3620	1

Catalog Number	Drawing #	A	C(1)	D	E	F	G	H	L	Ø R*
SQ 70	1	248	106,5	51	45	293	94	15	323	10,5
SQ 72	2	248	130,5	51	60	298	94	15	333	12,5
SQ 2 x 72	2	272	212,5	130	60	298	119	14	333	12,5
SQ 120	1	302	106,5	51	45	347	148	15	377	10,5
SQ 122	2	302	130,5	51	60	352	148	11	387	12,5
SQ 2 x 122	2	326	217,5	135	60	352	173	15	387	12,5
SQ 85 300	1	377	150	103	45	398	224	15	428	10,5
SQ 85 302	2	377	175	103	60	403	224	15	438	10,5
SQ 120 2 x 302	2	377	175	103	60	403	224	15	438	10,5
SQ 85 600	1	525	150	103	45	546	372	15	576	10,5
SQ 85 602	2	525	265	190	60	551	372	15	586	10,5
SQ 175 2 x 602	2	525	265	190	60	551	372	15	586	10,5

(1) With fuse connected

- Electrical connection of fuse on fuseholder by scews made in plated steel 8-8 class (supplied with fuseholder).
  Maximum recommended tightening torque: $22\,^{+0}_{-8}$ Nm for M8 screw.
- Fixing of base with M8 screws. Tightening torque 10 Nm ± 2.

* Electrical connection of fuseholder and wires by screws made in plated steel 8-8 class at least (supplied in "TRAC" version and not supplied in standard version.)
Maximum recommended tightening torque: $22\,^{+0}_{-8}$ Nm for M8 screw.

$44\,^{+0}_{-8}$ Nm for M10 screw.

$76\,^{+0}_{-8}$ Nm for M12 screw.

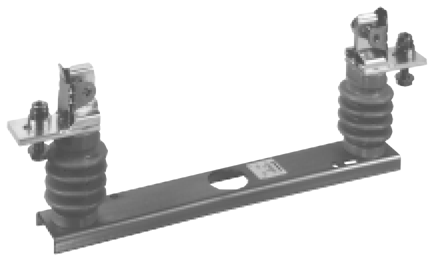

Semiconductor Fuses

Square-body Fuses

SPV

FUSE HOLDERS
FOR BLADE-TYPE
CV3 FUSES

- STURDY ASSEMBLY WITH VERY HIGH COLLISION AND TEMPERATURE WITHSTAND
- MOUNTING AS BASES
- FIBER-GLASS POLYESTER INSULATORS FOR BASIC APPLICATIONS, IN CORROSIVE ATMOSPHERES OR IN TRACTION
- VERY HIGH COLLISION WITHSTAND FOR TRACTION INTERLOCKING OF REPLACEMENT PART
- COMPLYING WITH IEC 77 STANDARD



MAIN CHARACTERISTICS

Catalog Number	Insulation voltage Ui (AC 50/60 Hz & DC)	Current (A)	Dielectric withstand test		Fire and fumes class
			RMS voltage 1 mn 50/60 Hz	Impulse voltage 1.2/50µs	
SPV 300	7 200 V	180 A	20 kV	40 kV	F_1 M_2 - NF 16 102 - UL 94 VO
SPV 600	7 200 V	180 A	20 kV	40 kV	F_1 M_2 - NF 16 102 - UL 94 VO

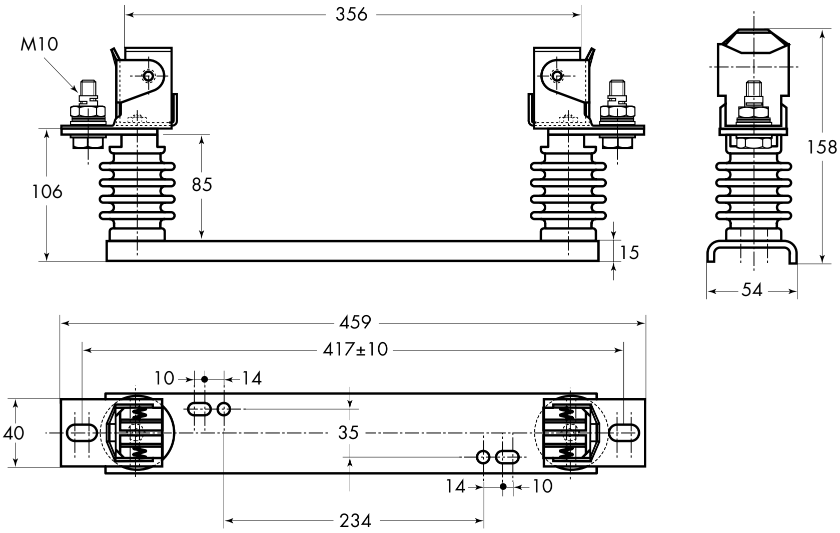
No use limitation for FERRAZ SHAWMUT fuses mounted in the above holders.

Vibration withstand:
Tests with sine vibrations carried out at ambiEnt with scanning each of the three main holder axes.
Spectrum: 1st segment (2 to 16 Hz) constant trip x = 5 mm peak.
2nd segment (16 to 250 Hz) constant acceleration γ = 5 g peak.
Exponential scanning speed: 1 octave per minute.
Duration: 2 hours per axis.

Square-body Fuses

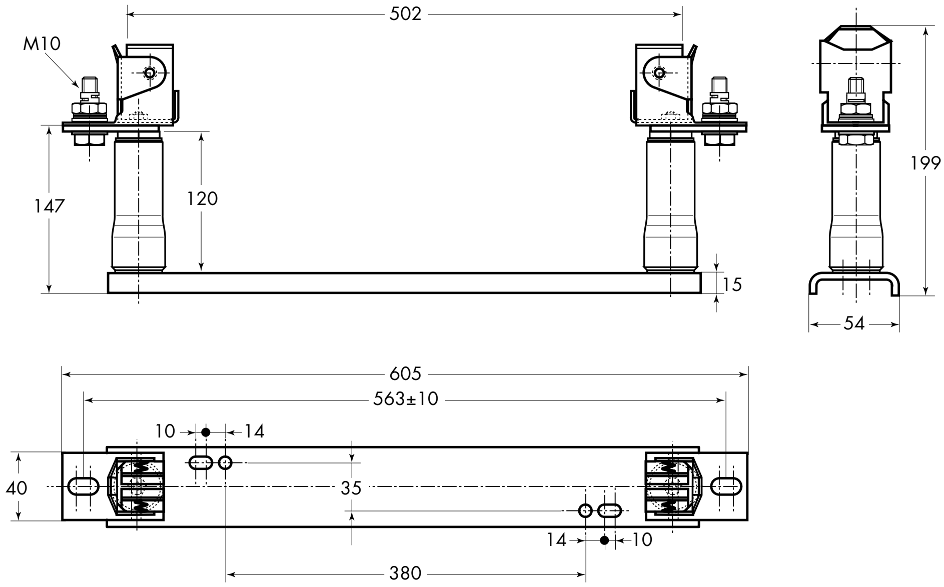
SPV

SPV 300



Code	Part #	Weight (g)	Packaging
SPV 300	W 098965	1 830	1

SPV 600



Catalog Number	Ref. Number	Weight (g)	Packaging
SPV 600	T 098963	2 900	1

- Electrical connection of fuseholder and wires by screws made in plated steel 8-8 class (supplied with fuseholder). Maximum recommended tightening torque: 44 ± 1 Nm for M10 screw.

- Fixing of base with M8 screws. Tightening torque 10 Nm ± 2.

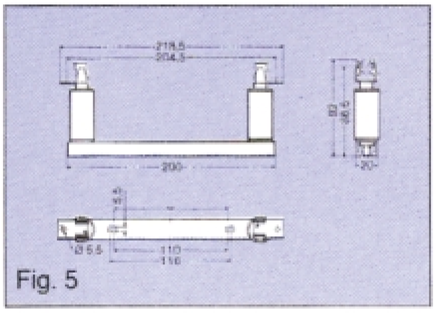
Bases

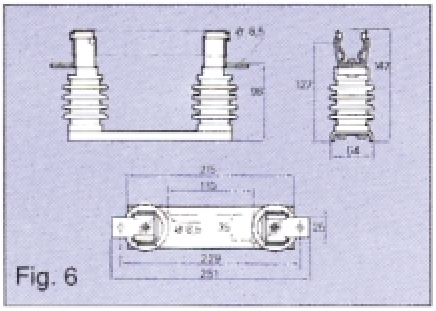
SI

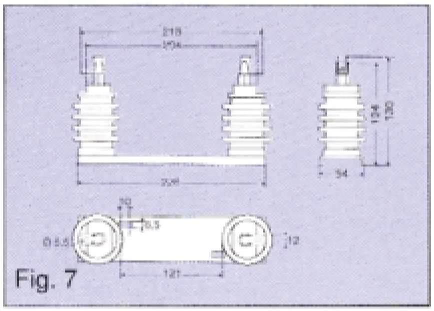


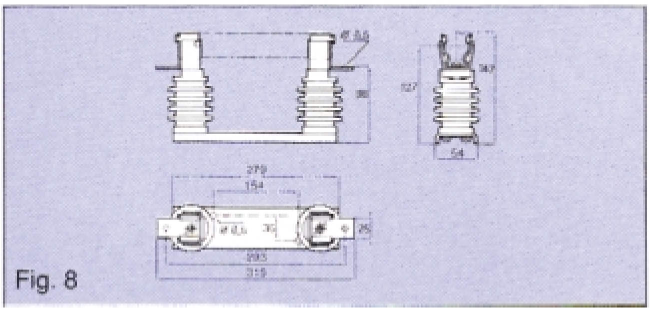


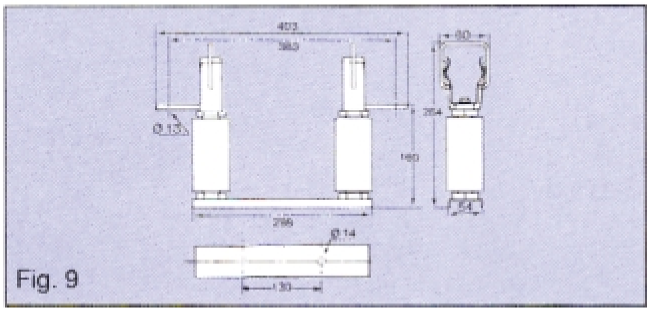



Fig. 5


Fig. 6


Fig. 7


Fig. 8


Fig. 9

Tension assignée *Rated voltage* (kV)	Tension de tenue à la masse *Withstand voltage to earth*		Designation Catalog Number	N° Réf. *Ref. no.*	Poids *Weight* (Kg)
	50 Hz - 1 mn (kV eff./*RMS*)	1,2/50µs (kV crête/*peak*)			
3,6	21	45	SI 50 10x180 (fig.5)	S 092 706	0,22
7,2	27	60	SI 85 36x190 (fig.6)	C 092 738	1,05
7,2	27	60	SI 85 10x180 (fig.7)	D 092 693	0,27
7,2	27	60	SI 85 36x250 (fig.8)	P 092 864	1,15
7,2	27	60	SI 120 55x259 (fig.9)	X 092 227	3,9

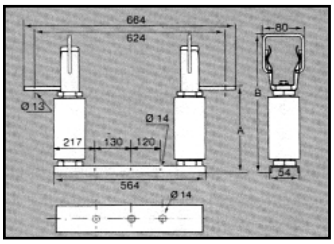
Designation Catalog Number	N° Réf. *Ref. no.*	Nombre de microcontacts *Number of microswitches*	Type de fusible pouvant être équipé *Type of fuse that can be equipped*	Longueur partie flexible *Length of flexible part*	Poids *Weight* (Kg)
MC 1-5 Flex	E 098 674	1	Fig. 2 et 3	395	0,110
MC 1-9 Flex	F 098 675	2	Fig. 2 et 3	395	0,120
MC 1-5 Flex Q	E 092 694	1	Fig. 4	395	0,205
MC 1-9 Flex Q	F 092 695	2	Fig.4	395	0,215
MC 1-5 Flex QF	E 092 855	1	IBD Range		0.220
MC 1-9 Flex QF	F 092 856	2	IBD Range		0.230

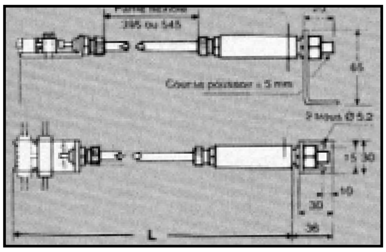
Blocks & Holders

Medium Voltage Fuses

Bases

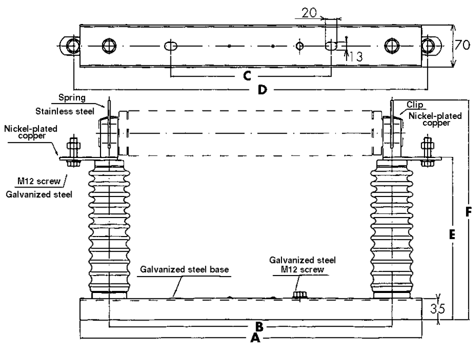
SI





Tension assignée Rated voltage kV	Code Catalog number	N° Ref Ref. no.	Tension de tenue à la masse Ground voltage withstand		A (mm)	B (mm)	Poids Weight (kg)
			50 Hz 1 mm (KV elf/RMS)	1,2/50 µS (KV crete peak)			
7,2	SI 120 55x520	K092354	27	60	161	260	2,8
12/17,5	SI 175 55x520	Q092934	45	95	216	315	3,6
24	SI 225 55x520	R092935	55	125	266	365	4,8
36	SI 310 55x520	L092355	75	170	351	450	6,0

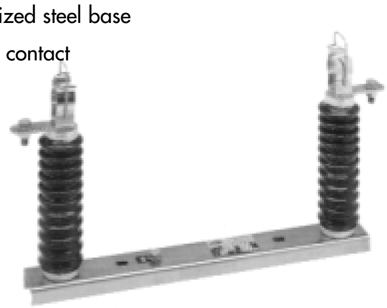
Tension nominale du support correspondant Nominal voltage of corresponding fuse holder (kV)	Code Catalog number	N° Ref Ref. no.	Nombre de micro-contacts Number of microswitches	Longueur partie flexible Length of flexible part (mm)	L (mm)	Poids Weight (kg)
7.2	MC 1-5 N FlexQ	E092694	1	395	560	0,205
7.2	MC 1-9 N FlexQ	F092695	2	395	560	0,215
12 to 95	MC 1-5 N Q640	T092615	1	545	710	0,220
12 to 35	MC 1-9 N Q640	K078945	2	545	710	0,230



Porcelain isolator

Galvanized steel base

Copper contact



Rated voltage (Kv)	Fuse length L (mm)	Cat. Number	Ref. Number	Rated withstand voltage line-mass		Dimensions (mm)						Weight (kg)
				50 HZ - 1 mm Kv rms	1,2/50 µs Kv peak	A	B	C	D	E	F	
7.2	192	SI 7.2 / 192	G209421	20	60	400	226	322	347	173	268	3.8
12	292	SI 12/292	H209422	28	75	424	324	200	445	173	268	4.1
17.5	292	SI 17.5/292	J209423	38	95	424	324	200	445	218	313	5.1
24	442	SI 24/442	K209424	50	125	576	476	270	597	268	363	5.5
24	537	SI 24/537	L209425	50	125	670	570	350	691	268	363	7.3
36	537	SI 36/537	M209426	70	170	670	570	350	691	352	447	7.7

Clips

MR

CLIPS
FOR FERRULE STYLE FUSES
ø 10 - 14 - 22 - 27 - 36



SILVER-PLATED COPPER CLIPS:

EXTREMELY HIGH THERMAL AND ELECTRIC CONDUCTIVITY

MOUNTING TYPE:

- SCREWING ON ISOLATORS
- SCREWING ON BARS OR INSULATED BARS
- WELDING ON P.C.B. (MR 10 CI)

STAINLESS STEEL PRESSURE SPRINGS:

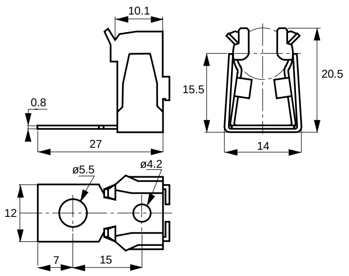
- HIGHLY RESISTANT TO SALT SPRAY

MAIN CHARACTERISTICS

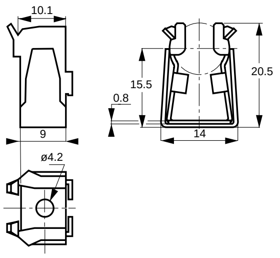
Catalog Number	Current rating I_N(A)	Maximum R.M.S continuous current through I_N - rated current fuses (A)	Recommended copper cable section (mm^2)
MR 10 MR 10 CI	32 32	32 32	4 4
MR 14	63	63	10
MR 20	125	125	35
MR 22	135	135	35
MR 27	250	250	120
MR 36	250	250	120
MR 45	525	525	-
MR 55	750	750	-

Clips MR

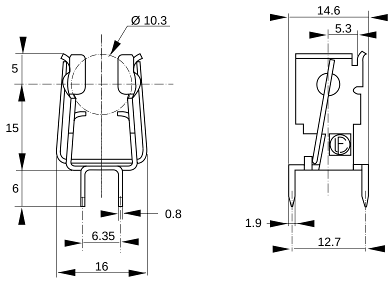
MR 10 - MR 10 CI



Catalog Number	Ref. Number	Weight (g)	Packaging
MR 10	B 098004	6	20 pieces

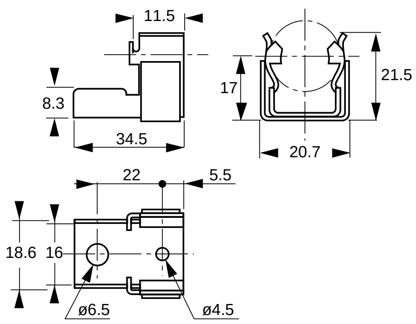


Catalog Number	Ref. Number	Weight (g)	Packaging
MR 10 without connection	C 098994	4	20 pieces



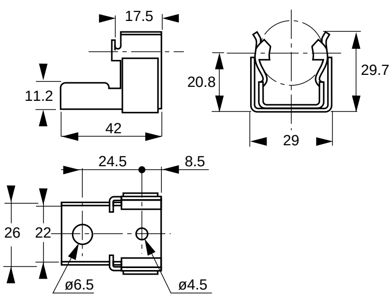
Catalog Number	Ref. Number	Weight (g)	Packaging
MR 10 CI	Y 098507	4	200 pieces

MR 14



Catalog Number	Ref. Number	Weight (g)	Packaging
MR 14	G 098170	5	10 pieces

MR 20.6



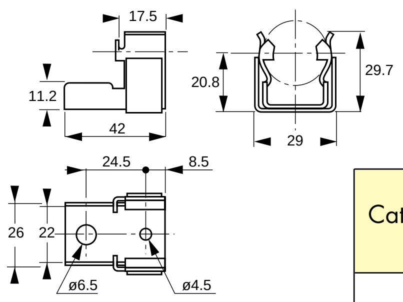
Catalog Number	Ref. Number	Weight (g)	Packaging
MR 20.6	H 099988	27	20 pieces

All Ferrule Fuses

Clips

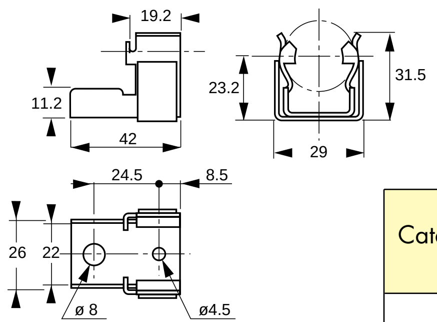
MR

MR 22



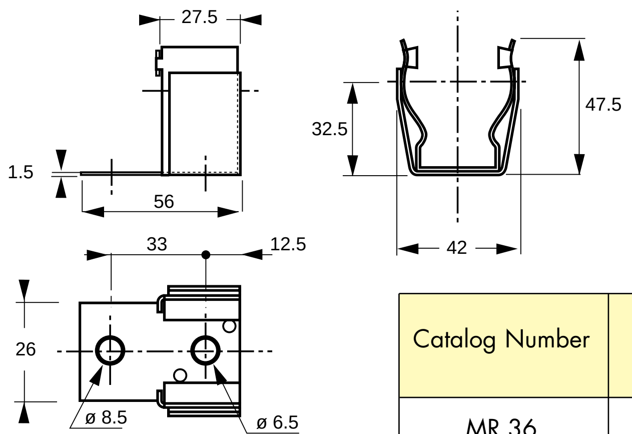
Catalog Number	Ref. Number	Weight (g)	Packaging
MR 22	K 098909	40	10 pieces

MR 27



Catalog Number	Ref. Number	Weight (g)	Packaging
MR 27	Y 092734	36	20 pieces

MR 36



Catalog Number	Ref. Number	Weight (g)	Packaging
MR 36	M 091275	75	1 piece

All clips silver-plated copper with stainless steel springs.

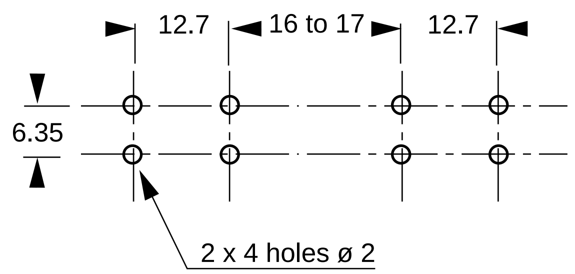
See next page for mounting instructions.

Clips

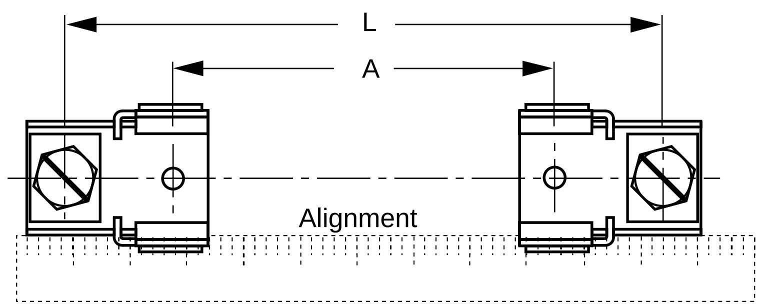
MR

MOUNTING INSTRUCTIONS

P.C.B. DRILLING FOR MR 10 CI CLIP (10 X 38 SIZE FUSE)

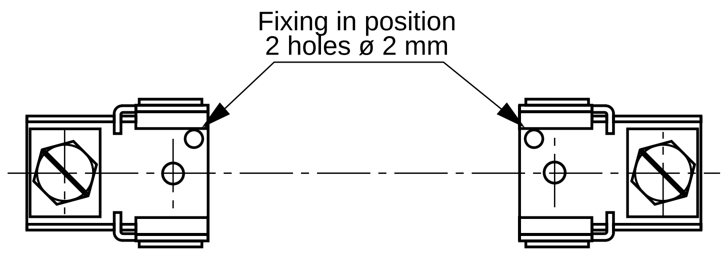


CLIP MOUNTING



Fuse size	A	L
10 x 38	31	61
14 x 51	42	86
22 x 58	42	91
20 x 51	36	85
20 x 127	113	162
20 x 190	175	224
27 x 60	41	91
36 x 127	100	148
36 x 190	165	231

Mounting of two elastic stop pins of 2 mm dia.
for fixing clips in position



Clips

CL-14



Cat. No. 228-700-520
(Pair at bottom)

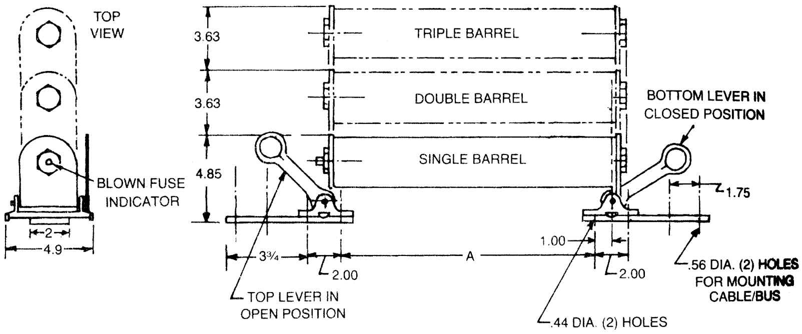
Cat. No. 228-700-530
(Single at top)

CLIP LOCK DESIGN FOR CL-14 SERIES

The Clip Lock design provides a reliable, high-pressure contact. Ferraz Shawmut CL-14 fuses have copper tabs which slide into position between the clip casting and cam. When the cam is locked by moving the pull ring, a high-pressure contact is made between the clip casting and fuse tab. Each clip includes two .44" diameter counter-sunk holes on 2" centers and two flat-head socket screws (3/8-16 UNRC, recommended torque 200 pound-inches) for mounting the clip on standard NEMA insulators. These clips will accommodate 5kV and 15kV CL-14 fuses rated 10E to 600E. Order catalog number 228-700-520 for one pair of fuse clips, enough for one fuse.

CL-14 Fuse Catalog Number	A Dimensions - Inches
A055C1D0R0-(10E-150E)	13.25
A055C1D0R0-(200E-400E)	19.25
A055C2D0R0-(450E-600E)	19.25
A155C1D0R0-(10E-50E)	19.25
A155C1D0R0-(65E-100E)	19.25
A155C2D0R0-(125E)	19.25
A155C3D0R0-(150E-300E)	19.25

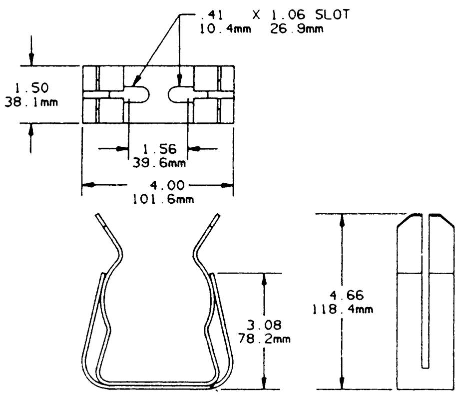
Mounting Details for Clip Lock Cat. No. 228-700-520



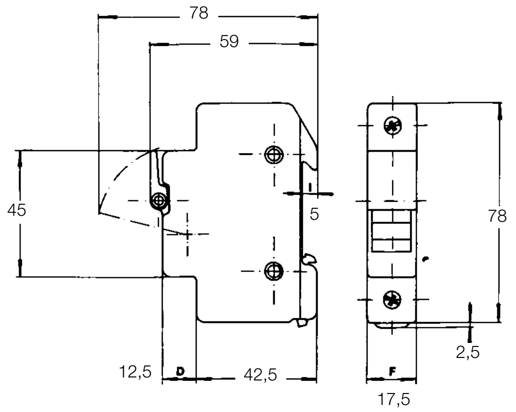
CLIPS FOR 3" DIAMETER FERRULE FUSES

These spring-reinforced clips will accommodate all 3" diameter, one and two barrel E-rated and R-rated medium voltage ferrule-type fuses. The clip and reinforcing spring are intended to be bolted to a copper busbar through two .41" x 1.06" slots. A minimum copper-bus cross section of 1/4" x 1-1/2" is recommended for maximum fuse ratings of 24R and 450E. Catalog number is 228-700-530 for one pair of spring-reinforced clips, enough for one fuse.

Cat. No. 228-700-530



Residential fuse-holders MSD-MSM



- Blown-fuse indicator (120/690V)
- Cable size:
  - Unipolar: 1 x 16 mm²
  - Unipolar + neutral: 1 x 10 mm²
- IP20

Poles	Size	Catalog Number		Reference Number		In-Vn	Packing
		Standard	+ Indicator	Standard	+ Indicator		



P219226

MSD: In max: 32A ; Vn max: 400V

Poles	Size	Catalog Number Standard	Catalog Number + Indicator	Reference Number Standard	Reference Number + Indicator	In-Vn	Packing
1	8 x 23	13502	13504	C217674	A218707	10A-250V	12
	10 x 25	13602	13604	R201288	Y211023	16A-250V	12
	8 x 31	13702	13704	V214102	F215124	20A-400V	12
	10 x 31	13802	13804	N218190	P219226	25A-400V	12
	10 x 38	13902	13904	S201289	Z211024	32A-400V	12
	N	14000		W214103			12
1+N (1 mod.)	8 x 23	13506	13508	N219225	T222956	10A-250V	12
	10 x 25	13606	13608	Q211545	Z213094	16A-250V	12
	8 x 31	13706	13708	H215632	Z217165	20A-400V	12
	10 x 31	13806	13808	R219757	V222957	25A-400V	12
	10 x 38	13906	13908	R211546	A213095	32A-400V	12



N219225

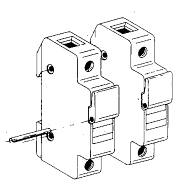
MSM: In max 16A ; Vn max 250V

Poles	Size	Catalog Number Standard	Catalog Number + Indicator	Reference Number Standard	Reference Number + Indicator	In-Vn	Packing
1 1+N (1 mod.)	5 x 20	**05952** **05956**		**J225707** **K225708**		16A-250V	12 12



J225707

Assembly pin

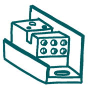
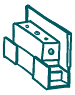


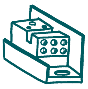
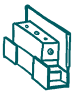
N. Mod.	Catalog Number	Reference Number	Packing
2	14030	G215125	10
3	14031	Q216145	10
4	14032	A217166	10

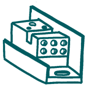
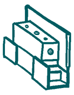
Approvals: IEC 269-3-1, NFC 61.201
Approvals: NF/USE (MSD)

Ferraz Shawmut

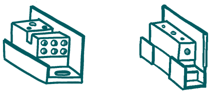
Power Distribution Blocks

Power Distribution Blocks



Mini / Intermediate / Large

62000-69000 Series







VERSATILE POWER DISTRIBUTION BLOCKS FOR CABLE TERMINATIONS

Ferraz Shawmut Power Distribution Blocks afford a safe, convenient way of splicing cables, splitting primary power into a variety of secondary circuits or providing a fixed junction tap-off point. Power block options include single or dual primary connections with up to 30 secondary connections.

Features/Benefits

✔ **Adder Poles**
All series have optional adder poles which snap onto the 1, 2 or 3- pole blocks and lock together to form as many total poles as required. Adder poles with a variety of terminations can be combined to match special wire size combinations.

✔ **Wire Connectors**
Standard aluminum box connectors accommodate aluminum and copper wire, 1 conductor per opening. Standard copper box connections are for copper wire only, 1 conductor per opening. Connector bars are all 1 piece and tin plated.

✔ **Insulators**
Insulators are virtually unbreakable, glass-filled polycarbonate on all series. "See-Through" Safety Covers are available which give greater safety and provide Service Entrance ratings for large and intermediate series blocks.

Ratings

✔ Ampere ratings from 90 to 1520

✔ 600V rated

Approvals

✔ Most sizes are UL Recognized Component - Guide XCFR2, File E73571

✔ Most sizes are CSA Certified:

Series 62, 63, 66, 68 - Class 6228,File 69363

Series 67, 69 - Class 3211, File 15469

HIGHLIGHTS:

✔ **Large -** 68000 and 69000 Series

✔ **Intermediate -** 66000 and 67000 Series

✔ **Mini -** 62000 and 63000 Series

APPLICATIONS:

✔ Box, stud and quick-connect terminations for copper and/or aluminum cables

Power Distribution Blocks

Mini

62000-63000 Series

Sizes, Ratings – Mini Series 62000 and 63000

Ampere rating based on NEC Table 310-16 for 90° copper wire.

ALUMINUM (90° C Cu/Al wire)

PRIMARY		SECONDARY		AMP RATING		CATALOG NUMBER				REFERENCE NUMBER			
WIRE RANGE AWG/kcmiL or STUD SIZE*	OPENINGS or STUDS PER POLE	WIRE RANGE AWG/kcmil or STUD SIZE*	OPENINGS or STUDS PER POLE	CSA	UL	ADDER	1 POLE	2 POLE	3 POLE	ADDER	1 POLE	2 POLE	3 POLE
Box to Box													
#4-14	1	#4-14	1 4	90	95	63100 63160	63101 63161	63102 63162	63103 63163	E222759 L218004	V223279 S218516	V201613 B219559	L204641 W222015
2/0-#14	1	2/0-#14 #2-14 #4-14	1 2 4	185	195	63150 63190 63130	63151 63191 63131	63152 63192 63132	63153 63193 63133	L213910 D211350 W214425	X214426 K211862 Z214934	C215443 X212379 F215952	G215953 J212896 F216458
Box to Stud													
2/0-#14	1 1	1/4-20 x 5/8 1/4-20 x 1/2 Tapped hole	1 1	185	195	63140 -	63141 -	63142 -	63143 -	V222014 -	F222760 -	K201098 -	W201614 -
Stud to Stud													
1/4-20 x 5/8	1	1/4-20 x 5/8	1	240	240	-	-	-	-	-	-	-	-
Box to Quick Connect													
#4-14	1	1/4 x .032QC	4	90	95	-	-	-	-	-	-	-	-

COPPER (90° C Cu wire only)

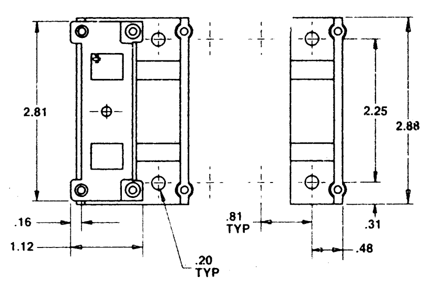
PRIMARY		SECONDARY		AMP RATING		CATALOG NUMBER				REFERENCE NUMBER			
Box to Box													
#4-14	1	#4-14	1 4	90	95	62100 62160	62101 62161	62102 62162	62103 62163	X211344 S201611	E211857 E204635	D212891 G211859	K213403 T212376
2/0-#14	1	2/0-#14 #2-14 #4-14	1 2 4	185	195	62150 62190 62130	62151 62191 62131	62152 62192 62132	62153 62193 62133	G218000 S222012 R223276	N218512 D222758 F201094	X219555 H201096 D204634	R222011 T201612 Y211345
Box to Stud													
2/0-#14	1 1	1/4-20 x 5/8 1/4-20 x 1/2 Tapped hole	1 1	185	195	62140 62170	62141 62171	62142 62172	62143 62173	G213906 T214423	S214422 X214932	Y215439 D215950	C215949 D216456
Stud to Stud													
1/4-20 x 5/8	1	1/4-20 x 5/8	1	240	240	62200	62201	62202	62203	H211860	V212377	J213908	V214424
Box to Quick Connect													
#4-14	1	1/4 x .032QC	4	90	95	62210†	62211†	62212†	62213†	E216457†	Q216973†	J218002†	Q218514†

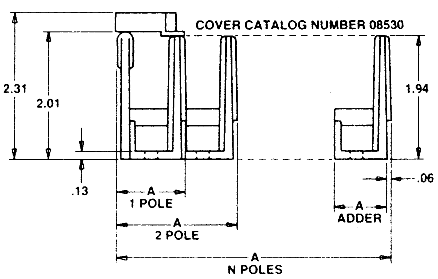
*Studs are furnished with nuts and washers. Recommended stud torque: (1/4-20) - 72 in. lbs. †Quick connector, not CSA Certified.

Note: Blocks for 5, 6 and 10 poles are also available. To order, simply modify the Adder catalog number. Example: 63l00 becomes 63106 for 6 poles.

Dimensions – 62000 and 63000 Series

Power Distribution Blocks





NUMBER OF POLES	DIMENSION A (Inches)
ADDER	.812
1	1.09
2	1.90
3	2.71
N	(.812 x N) + .273

Example for 10 poles:
A= (.812 x 10) + .273 = 8.39

SAFETY COVER - Catalog number 08530

Polycarbonate safety cover provides dead-front protection to 62000 and 63000 series power distribution blocks. One cover is needed on each pole (1-pole block requires 1 cover, 3-pole requires 3 covers, etc.) Each cover has a test prod hole in the center for circuit checking and each is marked with the reminder “REPLACE AFTER SERVICING EQUIPMENT”.

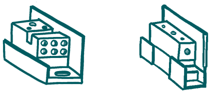
To order, simply determine the total number of poles to be protected and specify the same number of 08530 safety covers. Mounting screws are supplied with cover.

Recommended mounting screws for all 62000-63000 series: #10 (.190” diameter).

END BARRIER - Catalog number U09311

Polycarbonate end barriers snap on to PDB Adder blocks to form 1-pole blocks. Use one barrier per block.

Power Distribution Blocks



Intermediate

66000-67000 Series

Sizes, Ratings – Intermediate Series 66000 and 67000

Ampere rating based on NEC Table 310-16 for 75° copper wire.

PRIMARY		SECONDARY			ALUMINUM (90° C Cu/Al wire)							
					CATALOG NUMBER				REFERENCE NUMBER			
WIRE RANGE AWG/kcmiL or STUD SIZE	OPENINGS or STUDS PER POLE	WIRE RANGE AWG/kcmil or STUD SIZE	OPENINGS or STUDS PER POLE	AMPERE RATING	ADDER	1 POLE	2 POLE	3 POLE	ADDER	1 POLE	2 POLE	3 POLE
Box to Box												
2/0-#14	1	2/0-#14 #2-14 #2-14 #2-14 #6-14 #10-14*	1 4 6 8 10 12	175	67050 67570 67560 67580 67590 67110	67051 67571 67561 67581 67591 67111	67052 67572 67562 67582 67592 67112	67053 67573 67563 67583 67593 67113	Z222731 Q216950 W214402 H219013 K201075 R221988	P223251 C217467 X214909 B219536 V201590 A222732	E201070 J217979 B215419 W221992 C203851 Q223252	P201585 Q218491 D215927 E222736 D211327 F201071
350-#6	1	350-#6 2/0-#14 #2-14 #2-14 #2-14 #6-14 #10-14*	1 2 4 6 8 10 15	310	67000 67010 67670 67660 67630 67650 67620	67001 67011 67671 67661 67631 67651 67621	67002 67012 67672 67662 67632 67652 67622	67003 67013 67673 67663 67633 67653 67623	V219530 N201584 W201591 X221993 E215928 K217980 M213888	P221986 X211321 M203860 F222737 H216437 R218492 X214403	Y222730 V212354 L211840 W223257 R216951 J219014 Y214910	D201069 E212869 A212359 L201076 D217468 C219537 C215420
500-#4	1	500-#4 4/0-#6 4/0-#10 2/0-#14 #2-14 #2-14 #6-14 #10-14* 350-#6 & #2-14	1 2 2 4 6 8 10 18 1 3	380	67400 67420 - 67410 67460 67430 67480 67490 67450	67401 67421 - 67411 67461 67431 67481 67491 67451	67402 67422 - 67412 67462 67432 67482 67492 67452	67403 67423 - 67413 67463 67433 67483 67493 67453	M216947 R223253 - E219010 G217977 G211836 S201588 X212356 B215925	Z217464 G201072 - Y219533 N218489 K213886 A203849 G212871 E216434	F217976 R201587 - S221989 F219011 V214907 B211325 Q213385 N216948	M218488 A211324 - B222733 Z219534 Z215417 H211837 L213887 A217465
2/0-#14	2	2/0-#14 #2-14 #2-14 #6-14 #10-14*	2 6 8 10 15	350	67020 67510 67610 67530 67550	67021 67511 67611 67531 67551	67022 67512 67612 67532 67552	67023 67513 67613 67533 67553	R214398 V214401 K211839 P218490 B203850	R214904 W214908 Z212358 G219012 C211326	W215414 A215418 H212872 A219535 J211838	Y215922 C215926 R213386 V221991 Y212357
4/0-#10	2	4/10-#10	2	460	-	-	-	-	-	-	-	-
4/0-#6	2	4/0-#6 #2-14	2 6	460 460	67520 67540	67521 67541	67522 67542	67523 67543	F216435 D222735	P216949 T223255	B217466 J201074	H217978 T201589
Box to Stud												
350-#6	1	3/8-16 x 1	1	310	67250	67251	67252	67253	T214906	Y215416	A215924	D216433
500-#4	1	3/8-16 x 1-1/16 1/4-20 x 1-1/16	1 2	380 380	67220 67240	67221 67241	67222 67242	67223 67243	Q201586 W212355	Z203848 P213384	Z211323 J213885	F211835 T214400
Stud to Stud												
1/4-20 x 1-5/16	1	1/4-20 x 1-5/16	1	155	-	-	-	-	-	-	-	-
3/8-16 x 1-5/16	1	1/4-20 x 1-5/16 3/8-16 x 1-5/16	1 1	155 155	- -	- -	- -	- -	- -	- -	- -	- -
3/8-16 x 1-1/8	1	3/8-16 x 1-1/8 1/4-20 x 1-1/8	1 2	400 400	- -	- -	- -	- -	- -	- -	- -	- -

*Copper wire only

Stud-type connectors are furnished with nuts and washers. Recommended stud torque: (1/4-20) - 72 in. lbs; (3/8-16) - 228 in. lbs.

Power Distribution Blocks

Intermediate

66000-67000 Series

Sizes, Ratings – Intermediate Series 66000 and 67000

Ampere rating based on NEC Table 310-16 for 75° copper wire.

PRIMARY		SECONDARY			COPPER (75° C Cu wire only)							
					CATALOG NUMBER				REFERENCE NUMBER			
WIRE RANGE AWG/kcmiL or STUD SIZE	OPENINGS or STUDS PER POLE	WIRE RANGE AWG/kcmil or STUD SIZE	OPENINGS or STUDS PER POLE	AMPERE RATING	ADDER	1 POLE	2 POLE	3 POLE	ADDER	1 POLE	2 POLE	3 POLE
Box to Box												
2/0-#14	1	2/0-#14	1	175	66050	66051	66052	66053	T216424	B216937	N217454	X217968
		#2-14	4		66570	66571	66572	66573	W203845	V211319	D211833	T212353
		#2-14	6		66560	66561	66562	66563	W222728	M223249	B201067	L201582
		#2-14	8		66580	66581	66582	66583	D212868	M213382	F213882	P214396
		#6-14	10		66590	66591	66592	66593	P214902	T215412	W215920	Z216429
		#10-14*	12		66110	66111	66112	66113	D218480	V219001	N219524	H221980
350-#6	1	350-#6	1	310	66000	66001	66002	66003	A216936	M217453	W217967	C218479
		2/0-#14	2		66010	66011	66012	66013	M219523	F221978	F223243	W201062
		#2-14	4		66670	66671	66672	66673	W217461	C217973	J218485	B219007
		#2-14	6		66660	66661	66662	66663	V215413	X215921	A216430	J216944
		#2-14	8		66630	66631	66632	66633	C201068	M201583	X203846	W211320
		#6-14	10		66650	66651	66652	66653	E211834	G213883	Q214397	Q214903
		#10-14*	15		66620	66621	66622	66623	T219529	N221985	X222729	N223250
500-#4	1	500-#4	1	380	66400	66401	66402	66403	C213879	L214393	L214899	Q215409
		4/0-#6	2		-	-	-	-	-	-	-	-
		4/0-#10	2		66420	66421	66422	66423	A217971	F218482	X219003	Q219526
		2/0-#14	4		66410	66411	66412	66413	S215917	X216427	E216940	R217457
		#2-14	6		66460	66461	66462	66463	R212351	B212866	K213380	D213880
		#2-14	8		66430	66431	66432	66433	K221982	T222726	K223247	Z201065
		#6-14	10		66480	66481	66482	66483	Y216428	F216941	S217458	B217972
		#10-14*	18		66490	66491	66492	66493	G218483	Y219004	R219527	L221983
		350-#6	1									
		& #2-14	3		66450	66451	66452	66453	J201580	H203833	S211317	B211831
2/0-#14	2	2/0-#14	2	350	66020	66021	66022	66023	F201577	R203818	N211313	X211827
		#2-14	6		66510	66511	66512	66513	V222727	L223248	A201066	K201581
		#2-14	8		66610	66611	66612	66613	H216943	V217460	H218484	A219006
		#6-14	10		66530	66531	66532	66533	C212867	L213381	E213881	N214395
		#10-14*	15		66550	66551	66552	66553	T217459	Z219005	S219528	M221984
4/0-#10	2	4/10-#10	2	460	66520	66521	66522	66523	J203834	T211318	C211832	S212352
4/0-#6	2	4/0-#6	2	460	-	-	-	-	-	-	-	-
		#2-14	6	460	66540	66541	66542	66543	N214901	S215411	V215919	G216942
Box to Stud												
350-#6	1	3/8-16 x 1	1	310	66250	66251	66252	66253	Z217970	E218481	W219002	P219525
500-#4	1	3/8-16 x 1-1/16	1	380	66220	66221	66222	66223	Z212864	H213378	B213878	K214392
		1/4-20 x 1-1/16	2	380	66240	66241	66242	66243	D216939	Q217456	-	-
Stud to Stud												
1/4-20 x 1-5/16	1	1/4-20 x 1-5/16	1	155	66270	66271	66272	66273	R211316	A211830	Q212350	A212865
3/8-16 x 1-5/16	1	1/4-20 x 1-5/16	1	155	66210	66211	66212	66213	-	Q211315	Z211829	P212349
		3/8-16 x 1-5/16	1	155	66200	66201	66202	66203	R222724	H223245	X201063	H201579
3/8-16 x 1-1/8	1	3/8-16 x 1-1/8	1	400	66260	66261	66262	66263	J221981	S222725	J223246	Y201064
		1/4-20 x 1-1/8	2	400	66230	66231	66232	66233	K214898	P215408	R215916	W216426

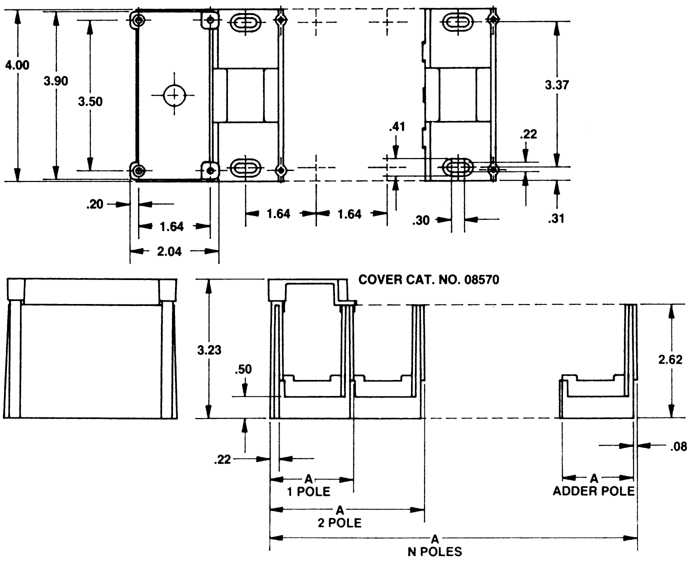
*Copper wire only

Stud-type connectors are furnished with nuts and washers. Recommended stud torque: (1/4-20) - 72 in. lbs; (3/8-16) - 228 in. lbs.

Power Distribution Blocks

Intermediate

66000-67000 Series



Dimensions – 66000 and 67000 Series Power Distribution Blocks

NUMBER OF POLES	DIMENSION A (Inches)
ADDER	1.64
1	1.94
2	3.57
3	5.20
N	(1.635 x N) + .30

Example for 10 poles:
A= (1.635 x 10) + .30 = 16.65 inches

Properties of Materials Used in Power Distribution Blocks

PROPERTY	UNITS	ASTM TEST	POLYCARBONATE
Specific Gravity		D792	1.21
IZOD	ft-lb/in	D256	4-6
Flexural Strength	psi	D790	13,200
Flexural Modulus	psi	D790	325,000
Tensile Strength	psi	D638	9,000
Compressive Strength	psi	D695	12,500
Water Absorption	24 hrs-%	D570	.15
Hardness	Rockwell	D785	M-85
	DuroD	D676	
Dielectric Stength		D149	
60 hertz, 25°C, s/t	vpm		425
60 hertz, 25°C, s/s	vpm		425
Dielectric Constant		D150	
60Hz-dry			3.01
1 Mhz-dry			2.96
Volume Resistivity	ohm-cm	D257	$>10^{16}$
Heat Deflecting	°F	D648	270
(°F@264 psi)			
Flammability (UL 94)			94 V-0

Note: Above data represents approximate values and are for reference only.

SAFETY COVER - CATALOG NUMBER 08570

Polycarbonate safety cover provides dead-front protection to 66000 and 67000 series power distribution blocks. One cover is needed for each pole (1-pole block requires 1 cover, 3-pole requires 3 covers, etc.) Each cover has a test prod hole in the center for circuit checking and each is marked with the reminder “REPLACE AFTER SERVICING EQUIPMENT”. Mounting screws are supplied with cover.

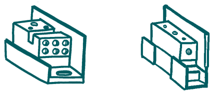
To order, simply determine the total number of poles to be protected and specify the same number of 08570 safety covers.

Recommended mounting screws for all 66000-67000 series: #10 (.190 diameter).

END BARRIER - Catalog number U09705

Polycarbonate end barriers snap on to PDB Adder blocks to form 1-pole blocks. Use one barrier per block.

Power Distribution Blocks



Large

68000-69000 Series

Sizes, Ratings – Large Series 68000 and 69000

Ampere rating based on NEC Table 310-16 for 75° copper wire.

PRIMARY		SECONDARY			ALUMINUM (90° C Cu/Al wire)							
					CATALOG NUMBER				REFERENCE NUMBER			
WIRE RANGE AWG/kcmil	OPENINGS PER POLE	WIRE RANGE AWG/kcmil	OPENINGS PER POLE	AMPERE RATING	ADDER	1 POLE	2 POLE	3 POLE	ADDER	1 POLE	2 POLE	3 POLE
Box to Box												
350-#6	1	2/0-#14 #4-14 #10-14*	6 12 20	310	69170 69150 69630**	69171 69151 69631**	69172 69152 69632**	69173 69153 69633**	T222749 T216447 Y216451**	X201086 D216962 H216966**	H201602 Q217479 V217483**	G203970 X217991 B217995**
500-#4	1	500-#4 350-#6	1 2	380	69050 69060	69051 69061	69052 69062	69053 69063	B216960 R222747	N217477 G223267	V217989 V201084	V219024 F201600
		4/0-#6 4/0-#10	4 4		69510** -	69511** -	69512** -	69513** -	S215434** -	W215943** -	X216450** -	G216965** -
		2/0-#14 #4-14	6 12		69070 69080	69071 69081	69072 69082	69073 69083	P203931 T212882	P211337 B213395	V211848 Z213899	J212367 J214414
600-#2	1	600-#2	1	420	69640	69641	69642	69643	H218507	B219030	L222006	Y222753
1000-250	1	1000-250 500-#4 350-#6 4/0-#6	1 2 2 4	545	69000 69010 69020 69300**	69001 69011 69021 69301**	69002 69012 69022 69302**	69003 69013 69023 69303**	A216959 T219023 F223266 S217481**	M217476 M219546 T201083 Z217993**	T217988 E222000 E201599 F218505**	B218501 Q222746 N203930 Z219028**
		4/0-#10 2/0-#14 #2-14 #4-14	4 6 10 12		- 69030 69530** 69040	- 69031 69531** 69041	- 69032 69532** 69042	- 69033 69533** 69043	- N211336 A217994** H214413	- T211847 G218506** J214920	- S212881 A219029** M215429	- Y213898 S219551** Q215938
#4-14	2	#4-14	12	170	69180	69181	69182	69183	R211339	X211850	W212884	D213397
2/0-#14	2	#4-14 #10-14*	12 20	350	69160 69600	69161 69601	69162 69602	69163 69603	D218503 Z212887	X219026 Q214926	P219548 T215435	G222002 X215944
350-#6	2	350-#6 4/0-#6 4/0-#10 2/0-#14 #4-14	2 4 4 6 12	620	69120 69320** - 69130 69140	69121 69321** - 69131 69141	69122 69322** - 69132 69142	69123 69323** - 69133 69143	W201085 Z201088** - W211849 K214415	G201601 K201604** - K212368 L214922	D203944 G203993** - V212883 P215431	Q211338 S211340** - C213396 S215940
500-#4	2	500-#4 4/0-#6 4/0-#10 2/0-#14 #4-14	2 4 4 6 12	760	69090 69310 - 69100 69110	69091 69311 - 69101 69111	69092 69312 - 69102 69112	69093 69313 - 69103 69113	K214921 R219550 - P217478 N219547	N215430 J222004 - W217990 F222001	R215939 W222751 - C218502 S222748	C216961 K223270 - W219025 H223268
600-#2	2	600-#2 #14-4 & 3/0-#10	2 4	840	69650 69540	69651 69541	69652 69542	69653 69543	M223272 K222005	B201090 X222752	M201606 L223271	G204614 A201089
1000-250	2	500-#4	4	1090	-	69561**†	-	-	-	A211853**†	-	-
500-#4	4	#6-14 #6-14 & 2/0-#14	30 22 4	1520	- -	69191**† 69521**†	- -	- -	- -	A213900**† T217482**†	- -	- -

*Copper wire only **Not UL Recognized or CSA Certified †These 1 pole blocks are double width (5.31”)

Power Distribution Blocks

Large

68000-69000 Series

Sizes, Ratings - Large Series 68000 and 69000

Ampere rating based on NEC Table 310-16 for 75° copper wire.

PRIMARY		SECONDARY			COPPER (75° C Cu wire only)							
WIRE RANGE AWG/kcmil	OPENINGS PER POLE	WIRE RANGE AWG/kcmil	OPENINGS PER POLE	AMPERE RATING	CATALOG NUMBER ADDER	CATALOG NUMBER 1 POLE	CATALOG NUMBER 2 POLE	CATALOG NUMBER 3 POLE	REFERENCE NUMBER ADDER	REFERENCE NUMBER 1 POLE	REFERENCE NUMBER 2 POLE	REFERENCE NUMBER 3 POLE
Box to Box												
350-#6	1	2/0-#14 #4-14 #10-14*	6 12 20	310	68170 68150 68630**	68171 68151 68631**	68172 68152 68632**	68173 68153 68633**	N212877 G219541 -	X213391 B221997 M211335**	S213893 K222741 X213897**	C214408 A223261 G214412**
500-#4	1	500-#4 350-#6	1 2	380	68050 68060	68051 68061	68052 68062	68053 68063	V203867 L212875	F211329 V213389	N211842 Q213891	C212361 A214406
		4/0-#6 4/0-#10	4 4		- 68510**	- 68511**	- 68512**	- 68513**	- A213394**	- W213896**	- F214411**	- G214918**
		2/0-#14 #4-14	6 12		68080 68640	68071 68081	68072 68082	68073 68083	V216954 H214919	F215423 G217471	H215931 N217983	L216440 V218495
600-#2	1	600-#2	1	420	68640	68641	68642	68643	H214919	L215428	P215937	S216446
1000-250	1	1000-250 500-#4 350-#6 4/0-#6	1 2 2 4	545	68000 68010 68020 -	68001 68011 68021 -	68002 68012 68022 -	68003 68013 68023 -	B212360 Z214405 K216439 -	K212874 A214912 T216953 -	T213388 E215422 F217470 -	P213890 G215930 M217982 -
		4/0-#10 2/0-#14 #2-14 #4-14	4 6 10 12		68300** 68030 68530** 68040	68301** 68031 68531** 68041	68302** 68032 68532** 68042	68303** 68033 68533** 68043	Z213393** T218494 - H222739	V213895** L219016 N215936** Y223259	E214410** E219539 R216445** N201078	F214917** Z221995 Z216958** Y201593
#4-14	2	#4-14	12	170	68180	68181	68182	68183	D214915	H215425	K215933	N216442
2/0-#14	2	#4-14 #10-14*	12 20	350	68160 68600	68160 68601	68162 68602	68163 68603	A201595 E223265	A201595 S201082	H211331 D201598	E212363 Q203909
350-#6	2	350-#6 4/0-#6 4/0-#10 2/0-#14 #4-14	2 4 4 6 12	620	68120 - 68320** 68130 68140	68121 - 68321** 68131 68141	68122 - 68322** 68132 68142	68123 - 68323** 68133 68143	W213390 - R219021** G215424 H217472	R213892 - K219544** J215932 P217984	B214407 - C221998** M216441 W218496	C214914 - N222744** W216955 N219018
500-#4	2	500-#4 4/0-#6 4/0-#10 2/0-#14 #4-14	2 4 4 6 12	760	68090 - 68310 68100 68110	68091 - 68311 68101 68111	68092 - 68312 68102 68112	68093 - 68313 68103 68113	M219017 - M215935 Z223260 G211330	F219540 - Q216444 P201079 P211843	A221996 - Z201594 Z201594 D212362	J222740 - K217474 Y203870 M212876
600-#2	2	600-#2 #14-4 & 3/0-#10	2 4	840	- 68540**	- 68541**	- 68542**	- 68543**	- -	- L217475**	- S217987**	- A218500**
1000-250	2	500-#4	4	1090	-	68561**†	-	-	-	S219022**†	-	-
500-#4	4	#6-14 #6-14 & 2/0-#14	30 22 4	1520	- - -	68191**† 68521**†	- -	- -	- -	X218497**† K215427**†	- -	- -

*Copper wire only

**Not UL Recognized or CSA Certified

†These 1 pole blocks are double width (5.31")

Power Distribution Blocks

Large

68000-69000 Series

Sizes, Ratings – Large Series 68000 and 69000 (continued)

Ampere rating based on NEC Table 310-16 for 75° copper wire

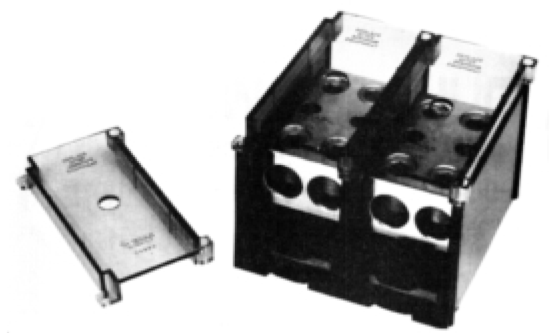
ALUMINUM (90° C Cu/Al wire)

PRIMARY WIRE RANGE AWG/kcmiL or STUD SIZE*	PRIMARY OPENINGS or STUDS PER POLE	SECONDARY WIRE RANGE AWG/kcmil or STUD SIZE	SECONDARY OPENINGS or STUDS PER POLE	AMPERE RATING	CATALOG NUMBER ADDER	CATALOG NUMBER 1 POLE	CATALOG NUMBER 2 POLE	CATALOG NUMBER 3 POLE	REFERENCE NUMBER ADDER	REFERENCE NUMBER 1 POLE	REFERENCE NUMBER 2 POLE	REFERENCE NUMBER 3 POLE
Box to Stud												
			1	Cu 380	69210	69211	69212	69213	L214416	M214923	Q215432	T215941
500-#4	1	3/8-16 x 1	2	Al 310	69270	69271	69272	69273	J201603	Q203978	Y211851	L212369
1000-250	1	1/2-13 x 1-3/16	1	Cu 545	69280	69281	69282	69283	X212885	E213398	B213901	N214924
		3/8-16 x 1	2	Al 445	69240	69241	69242	69243	Y217992	E218504	Y219027	Q219549
		2/0-#14	4	545	69260	69261	69262	69263	H222003	V222750	J223269	Y201087
		#4-14	12	545	69290	69291	69292	69293	R215433	V215942	W216449	F216964
1/2-13 x 1	1	2/0-#14	4	1000	-	-	-	-	-	-	-	-
		#4-14	12	1000	-	-	-	-	-	-	-	-
Stud to Stud												
1/2-13 x 1-3/8	1	1/2-13 x 1-3/8	1	400	-	-	-	-	-	-	-	-

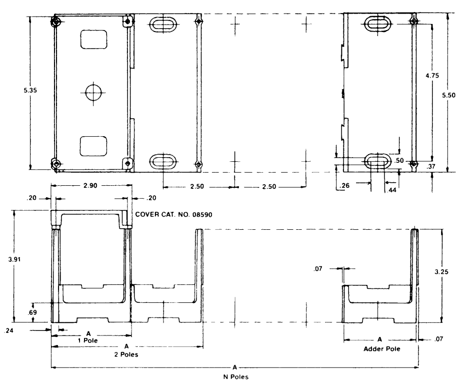
COPPER (75° C Cu wire only)

PRIMARY WIRE RANGE AWG/kcmiL or STUD SIZE*	PRIMARY OPENINGS or STUDS PER POLE	SECONDARY WIRE RANGE AWG/kcmil or STUD SIZE	SECONDARY OPENINGS or STUDS PER POLE	AMPERE RATING	CATALOG NUMBER ADDER	CATALOG NUMBER 1 POLE	CATALOG NUMBER 2 POLE	CATALOG NUMBER 3 POLE	REFERENCE NUMBER ADDER	REFERENCE NUMBER 1 POLE	REFERENCE NUMBER 2 POLE	REFERENCE NUMBER 3 POLE
Box to Stud												
			1	Cu 380	68210	68211	68212	68213	W203891	J211332	Q211844	F212364
500-#4	1	3/8-16 x 1	2	Al 310	68270	68271	68272	68273	Y218498	Q219020	J219543	M222743
1000-250	1	1/2-13 x 1-3/16	1	Cu 545	68280	68281	68282	68283	C223263	Q201080	B201596	N203907
		3/8-16 x 1	2	Al 445	68240	68241	68242	68243	P212878	Y213392	T213894	D214409
		2/0-#14	4	545	-	-	-	-	-	-	-	-
		#4-14	12	545	-	-	-	-	-	-	-	-
1/2-13 x 1	1	2/0-#14	4	1000	68260	68261	68262	68263	P216443	X216956	J217473	Q217985
		#4-14	12	1000	68290	68291	68292	68293	K211333	R211845	G212365	Q212879
Stud to Stud												
1/2-13 x 1-3/8	1	1/2-13 x 1-3/8	1	400	68200**	68201**	68202**	68203**	P219019**	H219542**	L222742**	B223262**

*Stud type connectors are furnished with nuts and washers.
Recommended stud torque: (3/8-16) - 228 in. lbs; (1/2-13) - 496 in. lbs.
**Not UL Recognized or CSA Certified



08590 cover and 69092 PDB with 2-08590 covers installed



Dimensions 68000 and 69000 Series PDB

NUMBER OF POLES	DIMENSION A (Inches)
ADDER	2.50
1	2.81
2	5.31
3	7.81
N	(2.50 x N) + .31

Example for 10 poles:
A= (2.50 x 10) + .31 = 25.31

SAFETY COVER - Catalog number 08590

Polycarbonate safety cover provides dead-front protection to 68000 and 69000 series power distribution blocks. One cover is needed for each pole (1-pole block requires 1 cover, 3-pole requires 3 covers, etc.) Each cover has a test prod hole in the center for circuit checking and each is marked with the reminder “REPLACE AFTER SERVICING EQUIPMENT”. Mounting screws are supplied with cover.

To order, simply determine the total number of poles to be protected and specify the same number of 08590 safety covers.

Recommended mounting screws for all 68000-69000 series: 1/4” (.250 dia.).

END BARRIER - Catalog number U09911

Polycarbonate end barriers snap on to PDB Adder blocks to form 1-pole blocks. Use one barrier per block.

Switches

Non-Fused Switches

Fused Switches

Front-handle Modular IT

MODULAR SWITCH-DISCONNECTORS
INDICATED INTERRUPTION
IT 25A TO 160A
Front-operated switches

- COMPLIANCE WITH: IEC 947-3, AC 21, AC 23 J UP TO 690V, Uimp. 8KV. - BS STANDARD.
- MOUNTING: 35 MM DIN RAIL, SCREWED ON BASE PLATE OR DOOR.
- FULLY MODULAR (FRAME 45 mm).
- EASY AND QUICK-TO-MOUNT ACCESSORIES (SNAP ON FOR 4TH POLE AND MICROSWITCHES). SPEEDS UP WIRING PROCESS WITH ELECTRICAL OR PNEUMATIC SCREW DRIVER.
- PROTECTION AGAINST HARSH CLIMATIC ENVIRONMENTS, HIGH WITHSTAND TO CREEPING ON INSULATED MATERIALS UL94 V1.
- SNAP CONTACTS.
- HIGH-PERFORMANCE INTERRUPTING RATING (AC 23 & DC 23 CLASSES).
- FOR HIGHER RATINGS, REFER TO TECHNICAL DATA SHEETS.



MAIN ELECTRICAL CHARACTERISTICS

Code			IT 25 A	IT 32A	IT 50A	IT 63A	IT 80A	IT 125A	IT 160A
Rated operated current at ambient Rated operational current under cover with a copper cable cross section of	40°c 40°c Scu	Ith Ithe mm²	25 25 6	32 32 6	50 50 16	63 63 16	80 80 50	125 125 70	160 160 70
Rated insulation voltage (Ui). Pollution class 3		V	750	750	750	750	750	750	750
Rated operational voltage AC-20 DC-20 Rated impulse withstand voltage		V kV	750 8	750 8	750 8	750 8	750 8	750 8	750 12
Rated operating current AC22 AC-21-A / AC-22-A AC21	500 V 690 V	A	16 16	25 25	45 45	63 63	80 80	125 125	160 160
Rated operating current AC-23-A	415 V 500 V 690 V	A	16 16 10	20 20 11	30 30 20	38 32 20	55 32 20	90 70 50	135 125 80
Rated operating power AC-23 with a 3-phase 1.500 rpm standard asynchronous motor at	220....240 V 380....440 V 500/690 V	kW	3 7,5 7,5/7,5	4 9 9/9	7,5 15 15/15	11 18,5 18,5/15	15 30 18,5/15	22 45 45/45	45 75 75/75
AC-23 Interrupting rating : Ic A under rated operating voltage (U)e	415 V 500 V 690 V	A	128 128 80	160 160 88	240 240 160	304 256 160	440 256 160	720 560 400	1080 1000 640
DC-23-A rating operating current / poles in series**	110 V 220 V 440 V	A	Available on request					125/2 63/4 —	160/2 160/2 160/3
RMS permissible short duration (1.5) rated current	0,2 s 1 s	kA	— 0,5	— 0,5	— 1	— 1	— —	— —	7 4
Mechanical endurance: operation cycles number (1 cycle = 1 opening + 1 closing of contacts)			10 000	10 000	10 000	10 000	10 000	10 000	8 000
Electrical endurance operation cycles number at Ie and cosφ 0.65	500 V		3000	3000	3000	3000	3000	3000	1000
Power loss per pole		W	0,3	0,6	1,4	2,8	4	6,3	6,5
Tightening torque for terminals	mini maxi	N.m	0,8 0,88	0,8 0,88	2 2,2	2 2,2	2,5 2,75	6 6,6	6 6,6
Permissible section for tightening of copper wires (section Scu is recommended)		mm²	0,75...10	0,75...10	1,5...25	2,5...25	10...50	10...70	10...70

** To be realised by the user. Distributing poles per conductor e.g. 2 poles in series

Front-handle Modular IT

MODULAR SWITCH-DISCONNECTORS AND ACCESSORIES

FRONT-OPERATED

Current rating Ith	Poles	Catalog #	Reference #	Non-padlockable selector type handle	Padlockable pistol type handle 3 padlocks Ø 8 mm IP 65	Necessary shaft for pistol type handle	Auxilliary contact 1 NC	Auxilliary contact 1 NO	Pole # 4 (for 3-pole switches only modulable on both sides)
DIN-rail or screwed on base mounting. IT with indicated interruption.									
25 A	3 4	IT 25E III IT 25E IV	F 210064 G 210065	Suplied with switch (red handle*)	N 207702 (Red & Yellow) H 208571 (Black) (Necessary shaft)	M 207701 (L = 130 mm) T 208558 (L = 330 mm)	M 207494 Two contacts max. can be snapped-on Located on left side	L 207493 Two contacts max. can be snapped-on Located on right side	S 208120 Prohibited for 4-pole switch
32 A	3 4	IT 32E III IT 32E IV	D 207486 E 207487						S 208120 Prohibited for 4-pole switch
50 A	3 4	IT 50E III IT 50E IV	F 207488 G 207489						T 208121 Prohibited for 4-pole switch
63 A	3 4	IT 63E III IT 63E IV	H 207490 J 207491						T 208121 Prohibited for 4-pole switch
80 A	3 4	IT 80E III IT 80E IV	B 208956 C 208957				D 210453 Double microswitch NO&NC		F 208960 Prohibited for 4-pole switch
125 A	3 4	IT 125E III IT 125E IV	D 208958 E 208959						G 208961 Prohibited for 4-pole switch
DIN-rail or screwed on base mounting. IT with visible interruption.									
160 A	3 4	IT 160E III IT 160E IV	D 208107 E 208108	G 208110 black handle (no microswitch)	M 209909(black) (extended shaft is supplied) N 209910 (Red & Yellow)	K 096609 (L = 290 mm)	L 208114 Necessity of using a K 208 113 base for enabling the mounting of 1 to 6 contacts auxiliary contacts (maxi 3 NO+3 NC). Cannot be mounted with the pistol type handle.	M 208115	F 208109 Prohibited for 4-pole switch Mounting on left side only (refer to drawing)

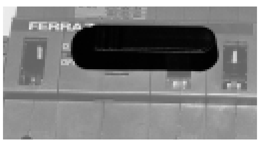
On door or side mounting. IT with indicated interruption.

Current rating Ith	Poles	Codes	Part #	Padlockable handle for on door mounting			Auxilliary contact 1 NC (left)	Auxilliary contact 1 NO (right)	Supplementary pole P : Phase - T : Ground
				Red & Yellow	Black				
32 A	3 4	IT 32ET III Select a 3-pole plus a 4th pole	N 208116	P 208117 P 209083	Q 208118 Q 209084		M 207494 Two contacts max. can be snapped-on	L 207493	R 208119 (P) T 209754 (T)
50 A	3 4	IT 50ET III Select a 3-pole plus a 4th pole	R 209085	P 209083	Q 209084				T 209087 (P) V 209755 (T)
63 A	3 4	IT 63ET III Select a 3-pole plus a 4th pole	S 209086						T 209087 (P) V 209755 (T)

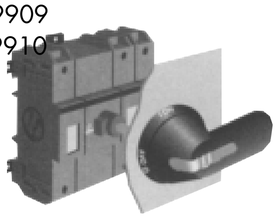
* P 207 496 padlocking device, except for IT 25E & 32E. Pole #4 is located on the right for 4-pole switches. If pole #4 is needed on the left select a 3-pole device and a 4th pole mounted on left. The ground pole in door-mounted switches achieves electric conduction, even if the switch is in off-position.

CONTROL

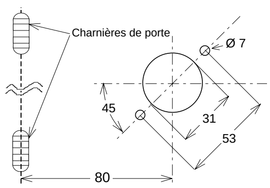
Pistol type handle IT 160 E
G 208110



Selector type handle IT 160 E
M 209909
N 209910



Drilling schematic



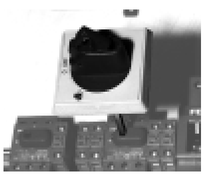




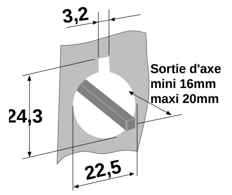
Ø 4 maxi

Padlocking device
P 207 496

Selector type handle IT 25 à 125
N 207 702
H 208 571

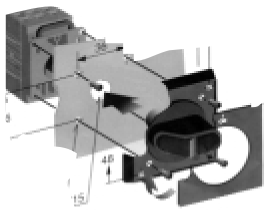


Drilling diagram

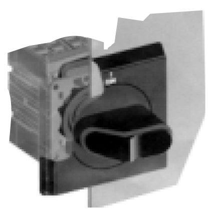


Control for on-door or side mounting IT 32 to 63 ET

Handle for IT32 & 63ET
P 209083
Q 209084



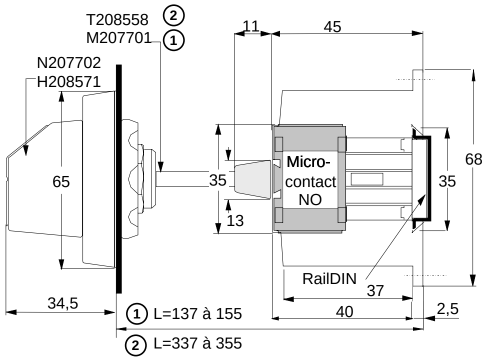
Handle for IT 32ET
P 208117
Q 208118

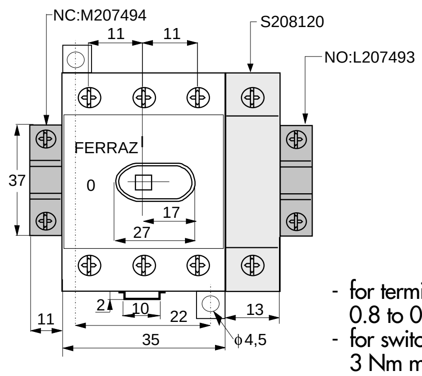


Front-handle Modular IT

DIMENSIONS

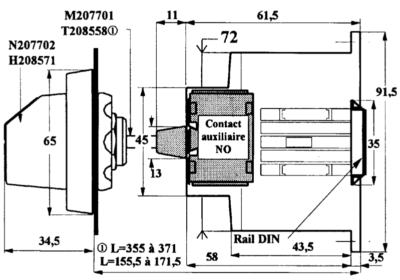
IT 25E - IT 32E

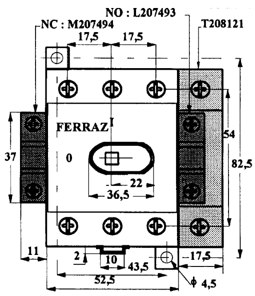




Tightening torques
- for terminals (Pozidrive screw) 0.8 to 0.88 Nm
- for switches (M4 screw) 3 Nm maximum.

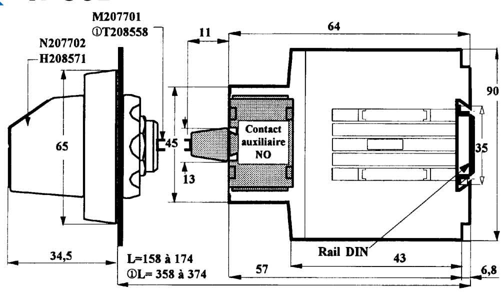
IT 50E - IT 63E

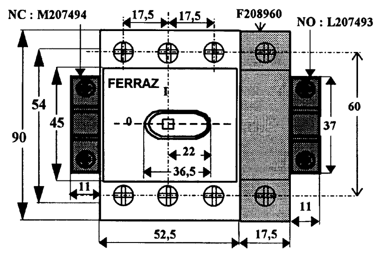




Tightening torques
- for terminals (Pozidrive screw) 2 to 2.2 Nm
- for switches (M4 screw) 3 Nm maximum.

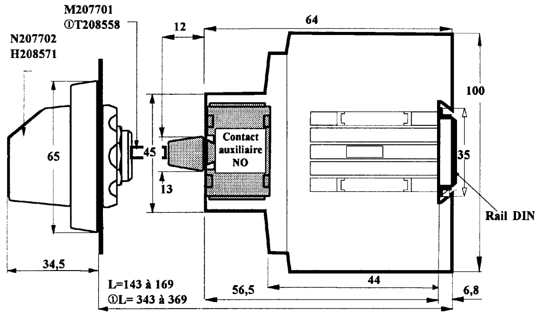
IT 80E

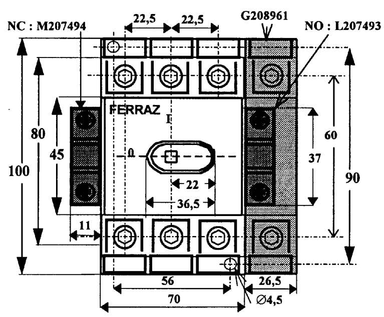




Tightening torques
- for terminals (Pozidrive screw) 2.5 to 2.75 Nm
- for switches (M4 screw) 3 Nm maximum.

IT 125E

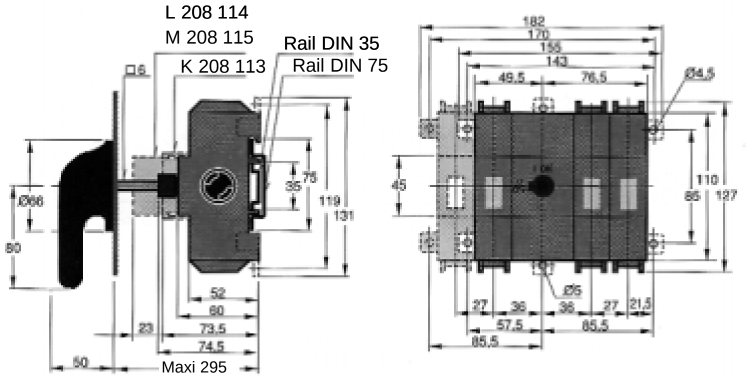




Tightening torques
- for terminals (Pozidrive screw) 6 to 6.6 Nm
- for switches (M4 screw) 3 Nm maximum.

Front-handle Modular IT

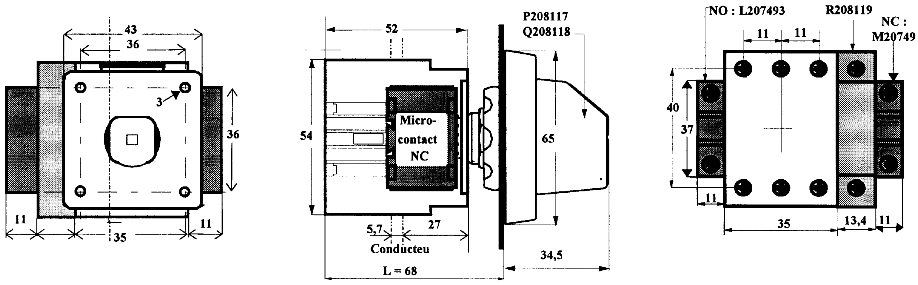
IT 160 E



Tightening torques

- for terminals (Hc screw) 6 to 6.6 Nm
- for switches (M4 screw) 3 Nm maximum.

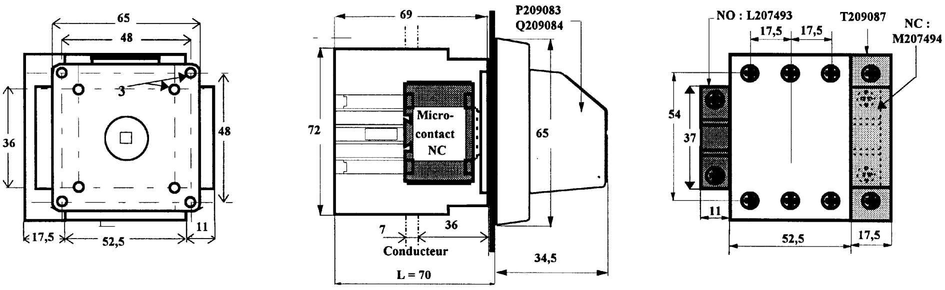
IT 32



Tightening torques

- for terminals (Pozidrive screw) 0.8 to 0.88 Nm
- for switches to be snapped on handles P208117 and Q208118
- for switches to be screwed via handles P209083 and Q209084 with 0.7 Nm max tightening torque

IT 50 ET 63 ET



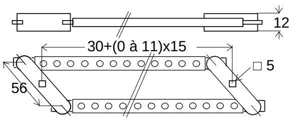
Tightening torques

- for terminals (Pozidrive screw) 2 to 2.2 Nm
- for switches to be screwed via handles P209083 and Q209084 with 0.7 Nm max tightening torque

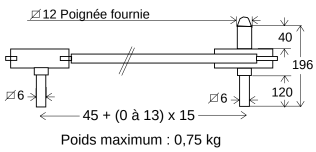
ACCESSORIES FOR OUTSIDE CONTROL

688-pole system : N 097 118 for IT 25 E to 125 E

To order with outside handle and 2 axles

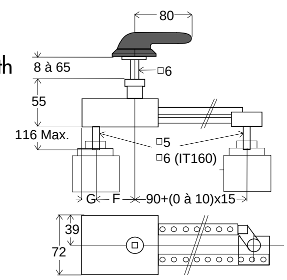


688-pole system:
A 209 024 for IT 160 E



Reversing system 1-0-2 : A 092 598 for IT 25 E to 125 E
T 081 713 for IT 160 E

Outside handle supplied with



Ref. number / Weight	D 207486	E 207487	F 207488	G 207489	H 207490	J 207491	L 207493	M 207494	P 207496	M 207701	N 207702	D 208107	E 208108	F 208109	G 208110	K 096 609	K 208113	L 208114	M 208115	N 208116
	110 g	150 g	270 g	350 g	270 g	350 g	20 g	20 g	5 g	25 g	70 g	1 kg	1,3 kg	300 g	20 g	50 g	10 g	20 g	20 g	130 g

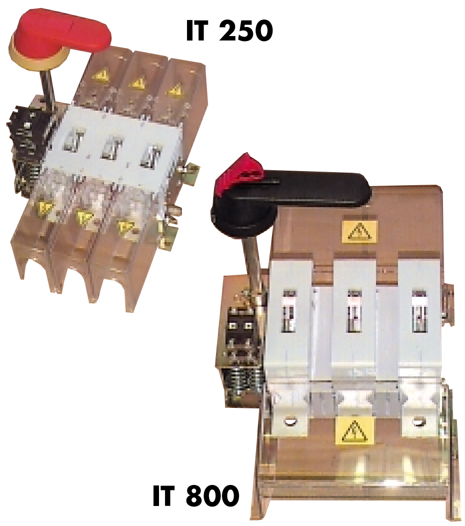
Ref. number / Weight	P 208117	Q 208118	R 208119	S 208120	T 208121	T 208 558	H 208 571	B 208956	C 208957	D 208958	E 208959	F 208960	G 208961	P 209083	Q 209084	R 209085	S 209086	T 209087	M 209909	N 209910
	70 g	70 g	30 g	50 g	70 g	70 g	70 g	310 g	450 g	360 g	500 g	140 g	140 g	70 g	70 g	270 g	270 g	80 g	100 g	100 g

Front-handle

IT

SWITCH-DISCONNECTORS
VISIBLE INTERRUPTION
IT 250 to 800 A
Side-operated switches

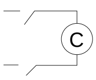
- **CONTROL:** FRONT HANDLE PADLOCKABLE IN OFF-POSITION WITH 3 PADLOCKS. SAFE AND RELIABLE INDICATION OF POSITION BY HANDLES.
- **INTERRUPTING:** VISIBLE INTERRUPTION.
  AC 23 & DC 23 ON LOAD OPENING AND CLOSING.
  INSULATION VOLTAGE: 1000 V.
- **MECANISM:** SNAP.
- **FIXING:** ON-BOARD OR ON-FRAME FOR CUBICLE BACKGROUND.
- **CONSTRUCTION:** COMPLYING WITH IEC 947 1&3 AND EN 60 947.
  PROTECTION DEGREE (WITH ACCESSORIES): IP 2X.
  PROTECTION FOR ANY CLIMATE.
  SILVER-PLATED COPPER ELECTRIC CONTACTS.
  ISOLATING PARTITIONS MADE WITH UL 94 VO MATERIALS.
  3 AND 4-POLE IN STANDARD MODELS.
  6 & 8-POLE MOUNTING AS ACCESSORIES.
  PRE-ISOLATING AND TERMINAL SHROUDS AS ACCESSORIES.



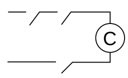
MAIN ELECTRICAL CHARACTERISTICS

			IT 250A	IT 315A	IT 350A	IT 500A	IT 630A	IT 800A
Rated operating current at ambient Rated operating current under cover	40°c 40°c	Ith Ithe	250 200	315 270	350 315	500 500	630 630	800 720
Rated insulation voltage (Ui). Pollution class 3		V	1000	1000	1000	1000	1000	1000
Rated operatingl voltage AC-20 DC-20 Rated impulse withstand voltage		V kV	1000 12	1000 12	1000 12	1000 12	1000 12	1000 12
RMS prospective short-circuit current with aM or gG class FerrazSchawmut fuses. Fuse Rating Permissible peak let-through current		kA A kA	100 200 40	100 250 40	100 315 40	100 400 45	80 630 55	80 800 —
Rated operating current AC-21-A and AC-22-A	690 V	A	200	250	315	500	630	800
Rated operating current AC-23-A	415 V 500 V 690 V	A	200 200 200	250 250 250	315 315 315	500 500 350	630 580 350	720 600 350
Rated operating power AC-23 in kW with a 3-phase 1.500 rpm standard asynchronous motor at	415 V 500 V 690 V	kW	90 132 170	132 160 200	160 200 250	200 315 315	315 355 355	355 400 355
AC-23 interrupting rating: Ic at cosφ = 0.35) under rated operating voltage (Ue)	500 V 690 V	A	1600 1600	2000 2000	2520 2520	4000 2800	4800 2800	4800 2800
DC-23-A rating operating current / poles in series** for	110 V 220 V 440 V	A	200/2 200/2 200/3	250/2 250/2 250/3	315/2 315/2 315/3	400/2 400/2 400/3	630/2 630/2 400/3	800/2 630/2 400/3
RMS permissible short duration (1.5) rated current		kA	8	8	8	16	17	17
Mechanical endurance: operating cycle number (1 cycle = 1 opening + 1 closing of contacts)			8 000	8 000	8 000	5 000	5 000	5 000
Electrical endurance: operating cycle number at Ie and cosφ 0.65	500 V		1000	1000	1000	1000	1000	500
Power loss per pole		W	3,5	5,5	8,5	13	22	40
Tightening torque for terminals	mini maxi	N.m	15 22	30 44	30 44	30 44	50 75	50 75

** To be connected in series by user.
Distributing poles per conductor e.g. 2 poles in series.



E.g. 3 poles in series, recommended mounting for 3-pole switches.

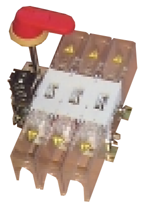


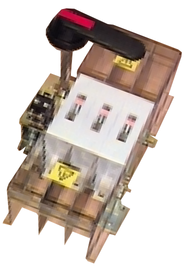
Front-handle IT

SWITCH-DISCONNECTORS VISIBLE INTERRUPTION AND ACCESSORIES

STANDARD SWITCHES

All of the following items are supplied separately.
For additional adaptations see "Accessories" section and order selected reference numbers.





Current rating Ith	Pole	Cat. Number	Ref. Number
250 A	3 4	IT 250 K III IT 250 K IV	L 202 134 D 202 127
315 A	3 4	IT 315 K III IT 315 K IV	R 202 139 P 202 137
350 A	3 4	IT 350 K III IT 350 K IV	F 202 152 E 202 151
500 A	3 4	IT 500 III IT 500 IV	M 096 450 P 096 498
630 A	3 4	IT 630 K III IT 630 K IV	M 096 151 N 096 152
800 A	3 4	IT 800 K III IT 800 K IV	P 096 153 Q 096 154

ACCESSORIES

Pre-isolating microswitch Single microswitch ③ 1 NO - 1 NC Twin microswitch ⑤ 1 NO - 1 NC Low level micro. ⑥ 1 NO - 1 NC Reference #	Protection against live terminal touching ● One shroud per terminals ✲ One partition upstream and one downstream Reference #	Inside ☛ or outside▼ black handle padlockable with 3 padlocks (8 mm dia.) ▼ (Door locked when handle is ON) Reference #
③ Y 202 168 ⑤ Z 202 169 ⑥ H 208 019	● A 202 170	S 209914 Supplied with a 140 mm shaft ☛ (for inside control order control adaptation)
③ S 086 588 ⑤ L 097 300 ⑥ J 208 020	✲ Q 096 499 ✲ Z 096 507 ✲ F 080 137 ✲ E 080 136 ✲ G 080 138 ✲ D 080 135	Q 209912 Supplied with a 250 mm shaft ☛ (for inside control order control adaptation)

MICROSWITCH CHARACTERISTICS

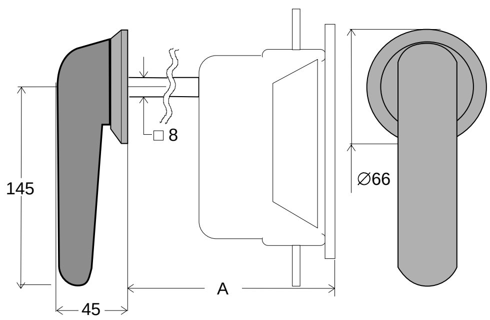
Microswitch reference #	Minimum for safe operation	Maximum for operation in AC 12	Application
① Y 202 168 ① S 086 588 ② Z 202 169 ② L 097 300	24 V 25 mA AC / DC	690 V 2 A cos φ = 0,9	Single-standard microswitch Twin-standard microswitch
③ H 208 019 ③ J 208 020	24 V 10 mA AC / DC	690 V 2 A cos φ = 0,9	Single microswitch: Aggressive environment or connection with a programmable machine

CONTROL HANDLE BULK

Inside padlockable side

Handle reference #	Switch model	A: mounting depth	A: with long shaft
S 209 914 T 209 915	IT 250 IT 315 IT 350	120 mm to 200 mm	W 202 166 220 to 300 mm H 206 455 480 to 560 mm

Weight: 0,25 kg.

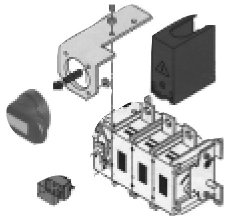


Non-fused Switches

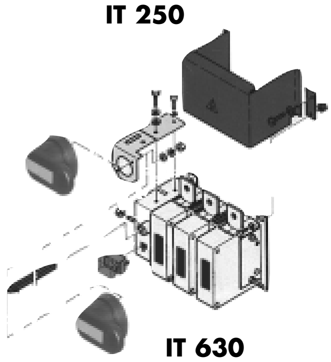
Front-handle IT

ACCESSORIES (CONTINUED)

Inside ☛ or outside▼ red and yellow handle padlockable with 3 padlocks (Ø 8 mm) ▼ (Door locked when handle is ON) Reference #	☛ Adaptation part for inside control handle (accessory) Reference #	Long shaft without handle for outside control Reference #	Current rating Ith
T 209915 Supplied with a 140 mm shaft ☛ (for inside control order control adaptation)	X 202 167	W 202 166 240 mm shaft H 206 455 500 mm shaft	**250 A** **315 A** **350 A**
R 209913 Supplied with a 250 mm shaft ☛ (pour la commande intérieure prendre l'adaptation de commande)	C 092 600	L 097 093 395 mm shaft P 092 979 465 mm shaft	**500 A** **630 A** **800 A**



IT 250



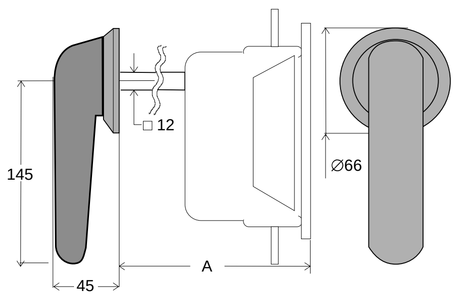
IT 630

CONTROL HANDLE BULK

Insulating, outside padlockable side

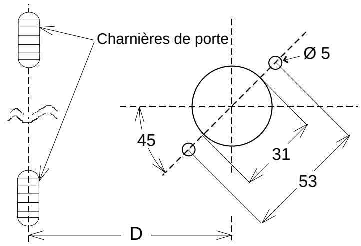
Handle reference #	Switch model	A: distance depth	A: with long shaft
Q 209912 R 209913	IT 500 IT 630 IT 800	230 mm to 320 mm	L 097 093 375 to 460 mm P 092 979 445 to 540 mm

Weight : 0,56 kg.



Drilling for outside handles

Handle reference #	D: minimal distance between door hinges shaft and handle shaft
S 209914 T 209915	80 mm
Q 209912 R 209913	150 mm



SHROUD FOR PROTECTION AGAINST LIVE PART TOUCHING

Terminal Shroud Ref.#	Switch model	A	B	C	Weight	Figure
A202170	IT 250KM IT 315KM IT 350KM	92,5	105	44	70 g	1
Q 096499	IT 500KM III	125	120	175	250 g	2
Z 096507	IT 500KM IV	125	120	221	300 g	2
F 080137	IT 630KM III	125	120	207	260 g	2
E 080136	IT 630KM IV	125	120	269	310 g	2
G 080138	IT 800KM III	125	120	223	270 g	2
D 080135	IT 800KM IV	125	120	293	320 g	2

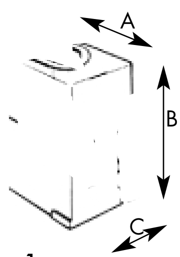


Fig. 1

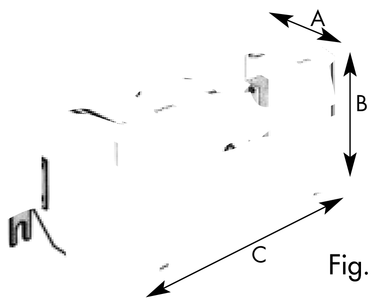


Fig. 2

Front-handle IT

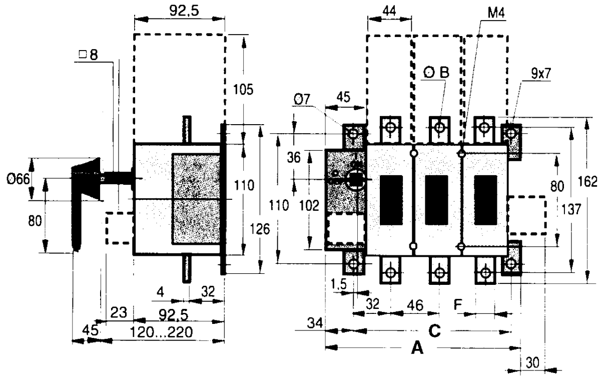
DIMENSIONS AND WEIGHT

IT 250 K - 315 K - 350 K

	IT 250 K		IT 315 K		IT 350 K	
Pole	III	IV	III	IV	III	IV
A (mm)	199	245	199	245	199	245
Ø B (mm)	9	9	11	11	11	11
C (mm)	157	203	157	203	157	203
F (mm)	20	20	25	25	25	25
Weight (kg)	3	3,7	3	3,7	3	3,7

Terminal tightening torque: M8 bolt 15 N.m to 22 N.m
M10 bolt 30 N.m to 44 N.m

Tightening torques for switches: M6 screw 6 N.m to 10 N.m

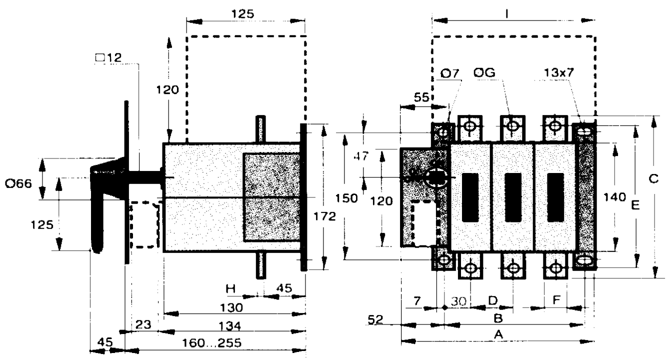


IT 500 K - 630 K - 800 K

	IT 500 K		IT 630 K		IT 800 K	
Pole	III	IV	III	IV	III	IV
A (mm)	216	262	248	310	264	334
B (mm)	153	199	185	247	201	271
C (mm)	205	205	223	223	223	223
D (mm)	46	46	62	62	70	70
E (mm)	180	180	185	185	185	185
F (mm)	25	25	40	40	40	40
ø G (mm)	11	11	13,5	13,5	13,5	13,5
H (mm)	4	4	5	5	5	5
I (mm)	175	221	207	269	223	293
Weight (kg)	5,2	6,4	6,2	7,6	6,2	7,6

Terminal tightening torque: M10 bolt 30 N.m to 44 N.m
M12 bolt 50 N.m to 75 N.m

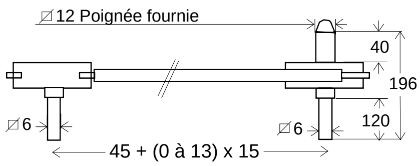
Tightening torques for switches: M6 screw 6 N.m to 10 N.m



ACCESSORIES FOR OUTSIDE CONTROL

VI and VIII-pole system: B 202 171 IT 250 K to 350 K

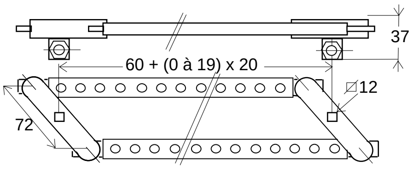
Outside handle supplied



Poids maximum : 0,75 kg

VI and VIII-pole : P 097 119 IT 500 K to 800 K

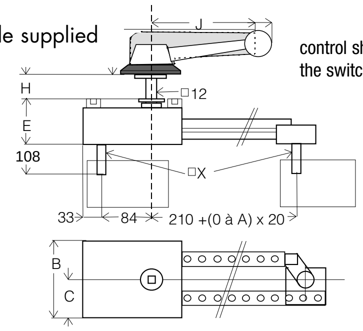
To order with outside handle and an additional shaft



Poids maximum : 0,70 kg

Reverse system 1-0-2 : C 202 172 IT 250 K to 350 K
B 092 599 IT 500 K to 800 K

Outside handle supplied



Ref. Number	Switch model	A	B	C	D	E	H	J	X	Weight
C 202 172	IT 250 to 350 K	11	83	34	61	53	8 à 15	145	8	kg
B 092 599	IT 500 to 800 K	18	90	40	100	63	16 à 23	220	12	kg

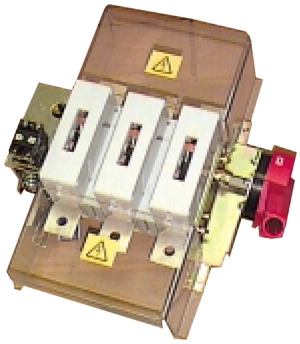
C 202 172 plastic handle. B 092 599 metal handle.

NOTE: Weights without accessories; tightening torques of switches depend on quality of bolts.

Side-handle **IT**

SWITCH-DISCONNECTORS
VISIBLE INTERRUPTION
IT 250A to 800A
Side-operated switches

- **CONTROL:** SIDE-HANDLE PADLOCKABLE IN OFF-POSITION WITH 3 PADLOCKS
  SAFE AND RELIABLE INDICATION OF POSITION BY HANDLES.
- **INTERRUPTING:** VISIBLE INTERRUPTION.
  AC 23 & DC 23 ON LOAD OPENING AND CLOSING.
  INSULATION VOLTAGE: 1000 V.
- **MECANISM:** SNAP.
- **FIXING:** ON-BOARD OR ON-FRAME FOR CUBICLE BACKGROUND.
- **CONSTRUCTION:** COMPLYING WITH IEC 947 1&3 AND EN 60 947.
  PROTECTION DEGREE (WITH ACCESSORIES): IP 2X.
  PROTECTION FOR ANY CLIMATE.
  SILVER-PLATED COPPER ELECTRIC CONTACTS.
  ISOLATING PARTITIONS MADE WITH UL 94 VO MATERIALS.
  3 AND 4-POLE IN STANDARD.
  6 & 8-POLE MOUNTING AS ACCESSORIES.
  PRE-ISOLATING AND TERMINAL SHROUDS AS ACCESSORIES.

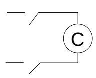


IT 800

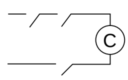
MAIN ELECTRICAL CHARACTERISTICS

Code			IT 250A	IT 315A	IT 350A	IT 500A	IT 630A	IT 800A
Rated operational current at ambiant Rated operational current under cover	40°c 40°c	Ith Ithe	250 200	315 270	350 315	500 500	630 630	800 720
Rated insulation voltage (Ui). Pollution class 3		V	1000	1000	1000	1000	1000	1000
Rated operational voltage AC-20 DC-20 Rated impulse without voltage		V kV	1000 12	1000 12	1000 12	1000 12	1000 12	1000 12
RMS Prospective short-circuit current with aM or gG class FerrazSchawmut fuses fuse rating Permissible peak let-through current		kA A kA	100 200 40	100 250 40	100 315 40	100 400 45	80 630 55	80 800 —
Rated operating current AC-21-A / AC-22-A	690 V	A	200	250	315	500	630	800
Rated operating current AC-23-A	415 V 500 V 690 V	A	200 200 200	250 250 250	315 315 315	500 500 350	630 580 350	720 600 350
Rated operating power AC-23 (kW) with a 3-phase 1.500 rpm standard asynchronous motor at	415 V 500 V 690 V	kW	90 132 170	132 160 200	160 200 250	200 315 315	315 355 355	355 400 355
AC-23 Interrupting rating : Ic A at cosφ = 0.35 under rated operating voltage (Ue)	500 V 690 V	A	1600 1600	2000 2000	2520 2520	4000 2800	4800 2800	4800 2800
DC-23-A rating operating current / poles in series** for	110 V 220 V 440 V	A	200/2 200/2 200/3	250/2 250/2 250/3	315/2 315/2 315/3	400/2 400/2 400/3	630/2 630/2 400/3	800/2 630/2 400/3
RMS permissible short duration (1.5) rated current		kA	8	8	8	16	17	17
Mechanical endurance : operation cycles number (1 cycle = 1 opening + 1 closing of contacts)			8 000	8 000	8 000	5 000	5 000	5 000
Electrical endurance : operation cycles number at Ie and cosφ 0.65	500 V		1000	1000	1000	1000	1000	500
Power loss per pole		W	3,5	5,5	8,5	13	22	40
Tightening torque for terminals	mini maxi	N.m	15 22	30 44	30 44	30 44	50 75	50 75

** To be connected in series by user
Distributing poles per conductor e.g. 2 poles in series



E.g. 3 poles in series, advised mounting
for 3-pole switches

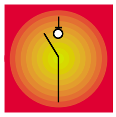


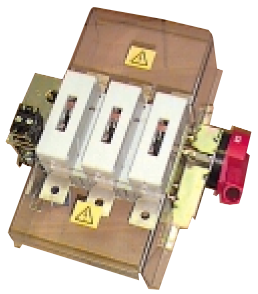


Side-handle IT

STANDARD SWITCHES

The following items are supplied separately.
For additional adaptations refer to the Accessories section and order selected reference numbers.





Current rating Ith	Pole	Code	Reference #
250 A	3 4	IT 250 KM III IT 250 KM IV	M 210070 N 210071
315 A	3 4	IT 315 KM III IT 315 KM IV	P 210072 Q 210073
350 A	3 4	IT 350 KM III IT 350 KM IV	R 210074 S 210075
500 A	3 4	IT 500 KM III IT 500 KM IV	T 210076 V 210077
630 A	3 4	IT 630 KM III IT 630 KM IV	W 210078 X 210079
800 A	3 4	IT 800 KM III IT 800 KM IV	Y 210080 Z 210081

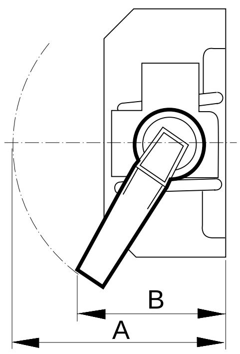
MICROSWITCH CHARACTERISTICS

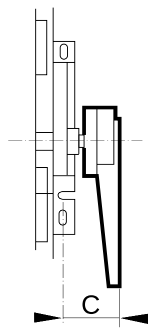
Microswitch code	Minimum for safe operation	Maximum for operation in AC 12	Application
Y 202 168 S 086 588 Z 202 169 L 097 300	24 V 25 mA AC / DC	690 V 2 A cos φ = 0,9	Single-standard microswitch Twin-standard microswitch
H 208 019 J 208 020	24 V 10 mA AC / DC	690 V 2 A cos φ = 0,9	Single microswitch. Aggressive atmosphere or connection with a programmable machine

CONTROL HANDLE BULK

Insulating, padlockable inside or outside

Handle reference #	Switch Model	A	B	C	D	E	Weight
T090936	IT 500KM IT 630KM IT 800KM	203	178	100	30	90	1,2 kg





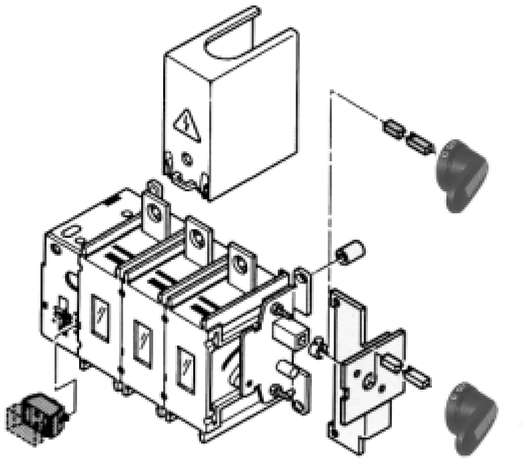
Side-handle

IT

SWITCH-DISCONNECTORS

ACCESSORIES

Pre-isolating microswitch Single micro ① 1 NO - 1 NC Double micro ② 1 NO - 1 NC Low level micro ③ 1 NO - 1 NC Reference #	Protection against live terminal touching *1 shroud per terminal (fig.1) •1 partition upstream and 1 downstream (fig.1) Reference #	Inside padlockable (red handle) (3 padlocks) Reference #	Outside padlockable (3 padlocks) ① black handle ② red and yellow handle ③ red handle Reference #	Current rating
① Y 202 168 ② Z 202 169 ③ H 208 019	*A 202170	See front-control switches	① H 210066 ② J 210067	250 A 315 A 350 A
① S 086 588 ② L 097 300 ③ J 208 020	•Q 096499 •Z 096507	T 090936	③ Y 090940	500 A III IV
	•F 080137 •E 080136			630 A III IV
	•G 080138 •D 080135			800 A III IV

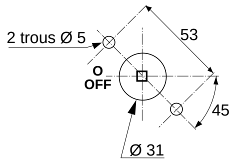


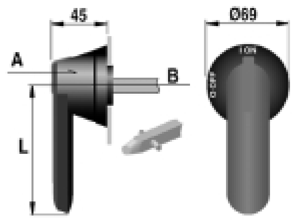
CONTROL HANDLE BULK

Insulating, padlockable inside or outside

Handle reference #	Switch model	◻B	L	IP	Weight
H 210066 J 210067	IT 250KM IT 315KM IT 350KM	8	80	65	0,3 kg

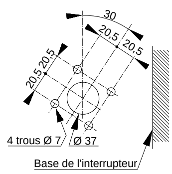
Distance between switch-disconnector and handle: 25 to 96 mm

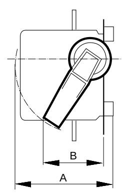


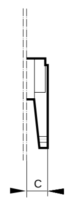


Handle reference #	Switch Model	A	B	C	D	Weight
Y 090940	IT 500KM	203	178	55	30	0,75 kg

Distance between switch-disconnector and handle: 45 to 120 mm







PROTECTION AGAINST LIVE TERMINAL TOUCHING

Terminal Shroud Ref.#	Switch model	A	B	C	Weight	Figure
A202170	IT 250KM IT 315KM IT 350KM	92,5	105	44	70 g	1
Q 096499	IT 500KM III	125	120	175	250 g	2
Z 096507	IT 500KM IV	125	120	221	300 g	2
F 080137	IT 630KM III	125	120	207	260 g	2
E 080136	IT 630KM IV	125	120	269	310 g	2
G 080138	IT 800KM III	125	120	223	270 g	2
D 080135	IT 800KM IV	125	120	293	320 g	2

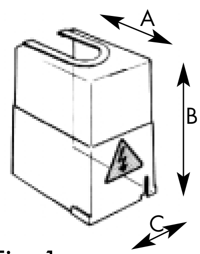


Fig. 1

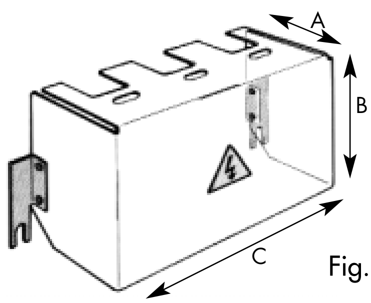


Fig. 2

Side-handle

IT

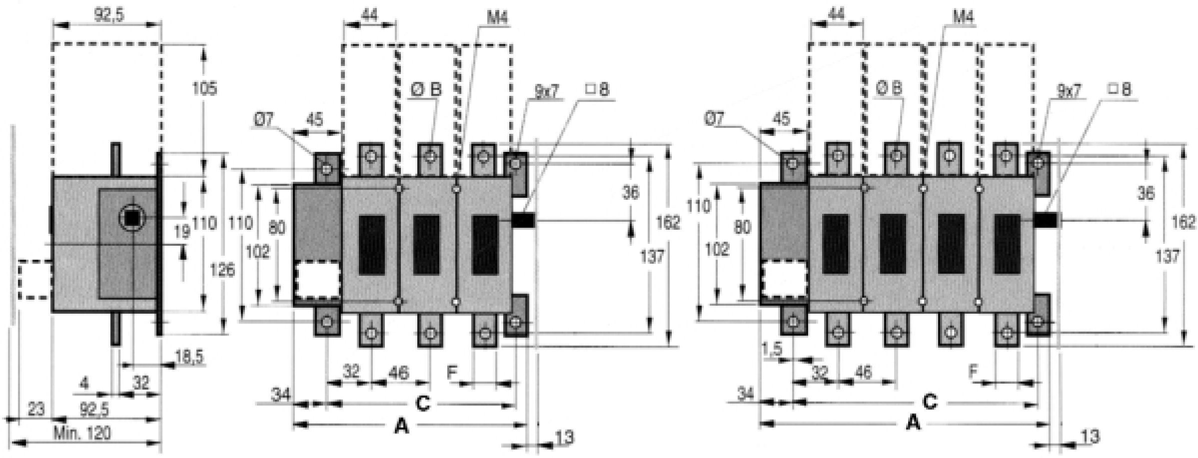
DIMENSIONS AND WEIGHT

IT 250 to 350

Connection: range 25 mm
with bolt M10 tightening torque 30 to 40 Nm.

Tightening torque for switches: M6 screw 6 N.m to 10 N.m

	IT 250KM		IT315KM		IT 350KM	
Pole	III	IV	III	IV	III	IV
A (mm)	199	245	199	245	199	245
Ø B (mm)	9	9	9	9	11	11
C (mm)	157	203	157	203	157	203
F (mm)	20	20	20	20	25	25
Weight (kg)	3	3,7	3	3,7	3	3,7

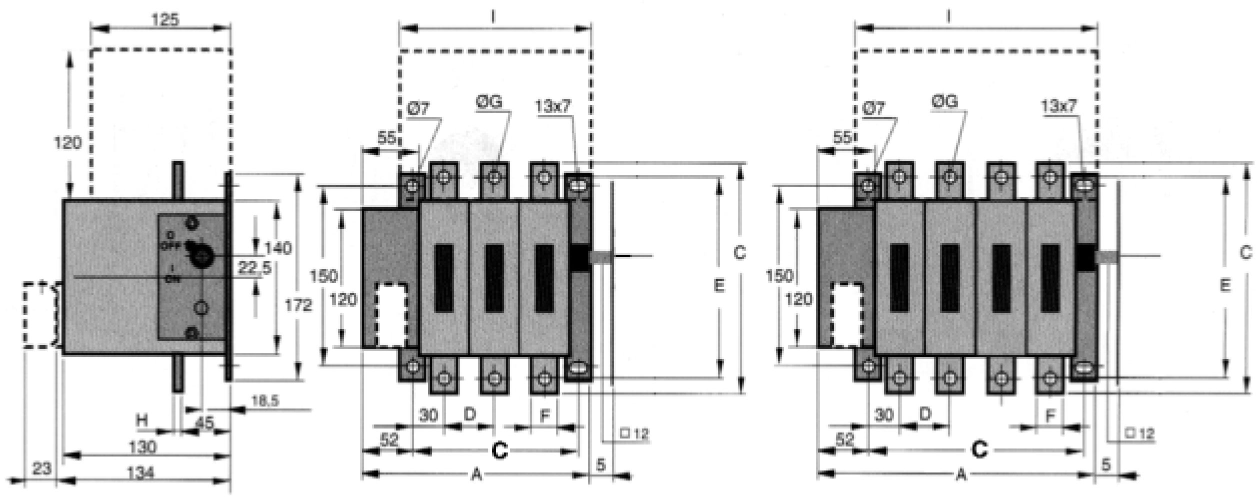


IT 500 to 800

Connection: range 25 mm
with M10 bolt and tightening torque 30 to 40 Nm.
Connection: range 40 mm
with M12 bolt and tightening torque 50 to 75 Nm.

Tightening torque for switches: M6 screw 6.N.m to 10 N.m

	IT 500KM		IT 630KM		IT 800KM	
Pole	III	IV	III	IV	III	IV
A (mm)	216	262	248	310	264	334
Ø B (mm)	153	199	185	247	201	271
C (mm)	205	205	223	223	223	223
d (mm)	46	46	62	62	70	70
E (mm)	180	180	185	185	185	185
F (mm)	25	25	40	40	40	40
G (mm)	11	11	13,5	13,5	13,5	13,5
H (mm)	4	4	5	5	5	5
I (mm)	175	221	207	269	223	293
Weight (kg)	5,2	6,4	6,2	7,6	6,2	7,6

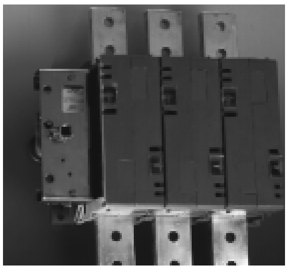


NOTE: Weights without accessories; tightening torques of switches depend on quality of bolts.

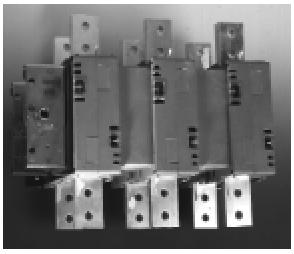
Front-handle IT

SWITCH-DISCONNECTORS INDICATED INTERRUPTION IT 1000 to 3150 A Front-operated switches

- DUAL-INDICATED INTERRUPTION
- POSITIVE FRONT CONTROL
- SNAP MECHANISM
- SILVER-PLATED COPPER ELECTRIC CONTACTS
- PROTECTION FOR ALL CLIMATES: ISOLATING PARTITIONS MADE WITH VO UL 94 MATERIALS
- COMPLIANCE WITH IEC 947-1 AND 3, NF C60 947
- HIGH-PERFORMANCE INTERRUPTING RATING (AC23 AND DC23 CLASSES)
- 3- AND 4-POLE MODELS STANDARD
- FOR OTHER RATINGS, REFER TO OUR TECHNICAL DATA SHEETS



IT 1250



IT 2500

MAIN ELECTRIC CHARACTERISTICS

		IT 1000	IT 1250	IT 1600	IT 2500	IT 3150
Rated operational current at ambient Rated operational current under cover	Ith Ithe	1000 1000	1250 1250	1600 1600	2500 2300	3150 2600
Rated operational voltage AC-20 DC-20 Rated insulation voltage (Ui) Rated impulse withstand voltage	V V kV	1 000 1 000 8	1 000 1 000 8	1 000 1 000 8	1 000 1 000 8	1 000 1 000 8
RMS prospective short-circuit current with aM or gG class FerrazSchawmut fuses Fuse Rating Permissible peak let-through current	kA A kA	50 800 ---	50 1000 ---	--- --- ---	--- --- ---	--- --- ---
Rating operating current: AC-21-A AC-22-A AC-23-A	690V 500V 500V	1000 1000 800	1250 1250 800	1600 1600 800	2500 ✢ 1600 ✢ 800 ✢	3150 ✢ 1600 ✢ 800 ✢
Rated operating power AC -23 in kW with a 3-phase 1.500 rpm standard asynchronous motor at	415V 500V 690V	400 450 ---	400 450 ---	400 450 ---	400 450	400 450
AC-23 interrupting rating: Ic A at cosj = 0.35 under rated operating voltage (Ue)	500 V 690V	6400 2500 ✪	6400 2500 ✪	6400 2500 ✪	6400 4800 ✹	6400 4800 ✹
DC-23-A rating operating current / poles in series** for	110 V 220 V 440 V	Consult us				
RMS permissible short duration (1.5) rated current	kA	33	33	33	37	37
Mechanical endurance: operation cycles number (1 cycle = 1 opening + 1 closing of contacts)		5 000	5 000	5 000	3 000	3 000
Electrical endurance : operation cycles number at Ie and cosφ 0.65	500 V	500	500	500	100 ✢	100 ✢
Power loss per pole	en W	27	40	67	90	140
Tightening torque for terminals	mini maxi	50 75	50 75	50 75	50 75	50 75

✪ cosφ = 0,95 ✹ cosφ = 0,65 ✢ use in class B

** To be connected in series by user. Distributing poles per conductor e.g. in series. E.g. 3 poles in series. Connection recommended.

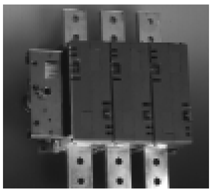
Front-handle

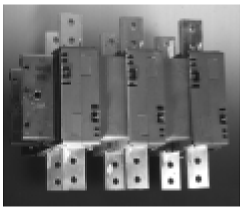
IT

ACCESSORIES

STANDARD SWITCHES

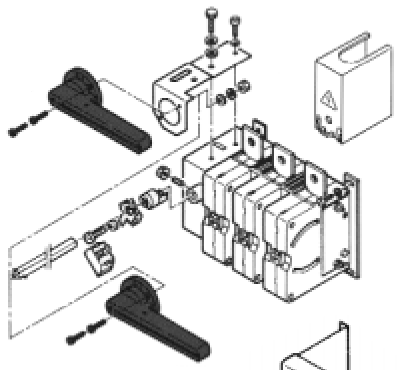
The following items are supplied separately.
For additional adaptations refer to Accessories section and order selected reference numbers.



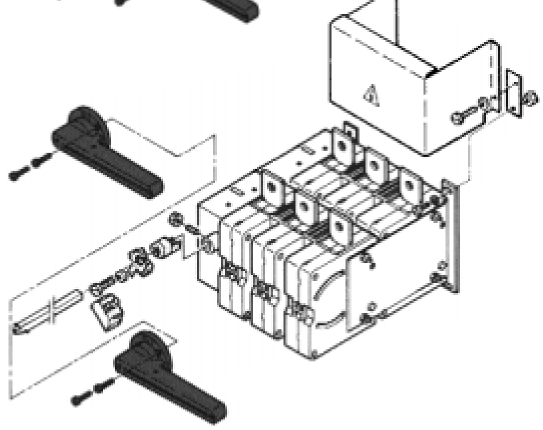


Current rating	Pole	Cat. Number	Ref. Number
1000 A	3	IT 1000 K III	B 081 559
	4	IT 1000 K IV	C 081 560
1250 A	3	IT 1250 K III	T 096 157
	4	IT 1250 K IV	V 096 158
1600 A	3	IT 1600 K III	R 096 155
	4	IT 1600 K IV	S 096 156
2500 A	3	IT 2500 K III	J 081 681
	4	IT 2500 K IV	H 081 680
3150 A	3	IT 3150 III	B 202 148
	4	IT 3150 IV	A 202 147

IT 1000K
IT 1600K



IT 2500K
IT 3150K



ACCESSORIES

Current rating	Pre-isolating microswitch Single microswitch ③ 1 NO - 1 NC Twin microswitch ⑤ 1 NO - 1 NC Low level micro. ⑥ 1 NO - 1 NC Code	Protection against live terminal touching ● One shroud per terminal ✵ One partition uspstream and one downstream Code	Inside ☞ or outside ▼ black handle padlockable with 3 padlocks (8 mm dia.) ▼ (Door locked when handle is ON) Code	Inside ☞ or outside ▼ red handle padlockable with 3 padlocks Ø 8 mm ▼ (Door locked when handle is ON) Code	☞Obligatory inside control adaptation for inside control Code	Long shaft withoud handle for outside control Code
1000 A 1250 A 1600 A	① S 086 588 ② L 097 300 ③ J 208 020	● S 095 880	Q209912 or Y210678 Supplied with a 250 mm shaft ☞ (for inside control order control adaptation)	R209913 or Z210679 Supplied with a 250 mm shaft ☞ (for inside control order control adaptation)	R 092 084	L 097 093 395 mm shaft P 092 979 465 mm shaft
2500 A III / IV 3150 A III / IV		✵ L 099 554 ✵ K 099 553 ✵ L 099 554 ✵ K 099 553	Y210678 oudside only	F099549 or Z210679 Only red handle	–	

Front-handle IT

MICROSWITCH CHARACTERISTICS

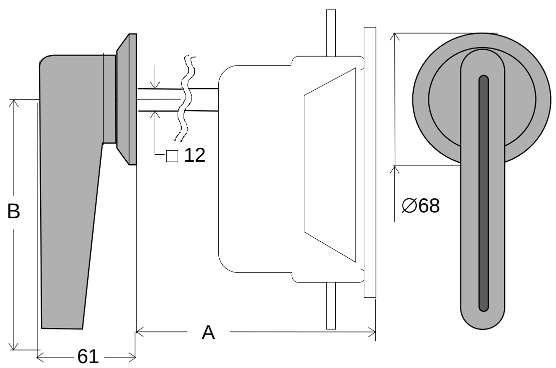
Microswitch ref. #	Minimum for sure operation	Maximum for operation in AC 12	Application
① S 086 588 ② L 097 300	24 V 25 mA AC / DC	690 V 2 A cos φ = 0,9	Single standard microswitch Twin standard microswitch
③ J 208 020	24 V 10 mA AC / DC	690 V 2 A cos φ = 0,9	Single microswitch : Agressive environment or connection with a programmable machine

CONTROL HANDLE BULK

Insulating, padlockable inside or outside

Handle reference #	Switch model	A : distance depth	A : with long shaft	B
Q209912 R209913	IT 1000 à IT 1600	255 mm to 325 mm	L 097 093 400 to 470 mm	145
Y210678 Z210679	IT 1000 à IT 3150		P 092 979 505 to 570 mm	175

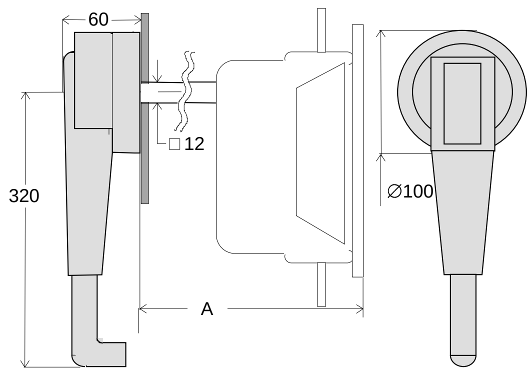
Weight: 0.56 kg.



Insulating, padlockable inside or outside

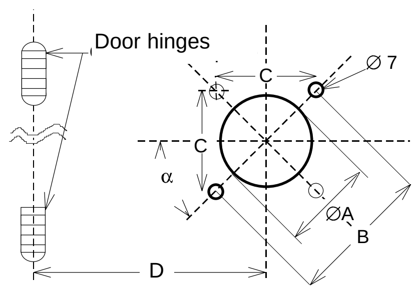
Handle reference #	Switch model	A: distance depth	A : with long shaft
F 099 549	IT 2500K IT 3150K	360 mm to 490 mm	L 097 093 570 to 700 mm P 092 979 675 to 800 mm

Weight: 1.2 kg.



Drilling for outside handles

Handle reference #	α	ØA mm	B mm	C mm	D : minimal distance between hinge shaft and handle shaft
Q209912 R209913 Y210678 Z210679	45°	31	53	2 holes only	150 mm
F 099 549	30°	37	58	41	150 mm



Front-handle

IT

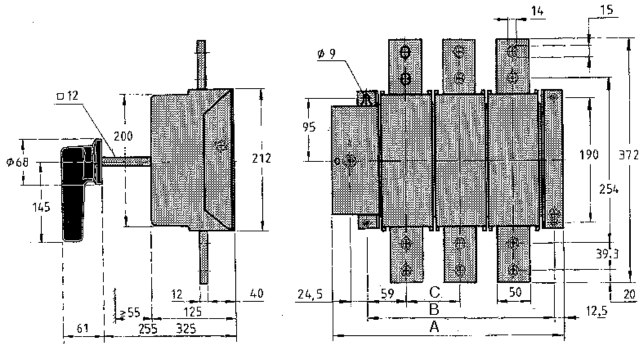
DIMENSIONS AND WEIGHT

IT 1000K - 1250 K - 1600 K

	IT 1000 K		IT 1200 K		IT 1600 K	
Pole	III	IV	III	IV	III	IV
A (mm)	343	423	343	423	363	453
B (mm)	278	358	278	358	298	388
C (mm)	80	80	80	80	90	90
d (mm)	12	12	12	12	16	16
Poids (kg)	16,3	20,5	16,3	20,5	17,5	22,5

Terminal tightening torque: M12 bolt 50 N.m to 75 N.m

Tightening torque for switches: M8 screw 11 N.m to 22 N.m

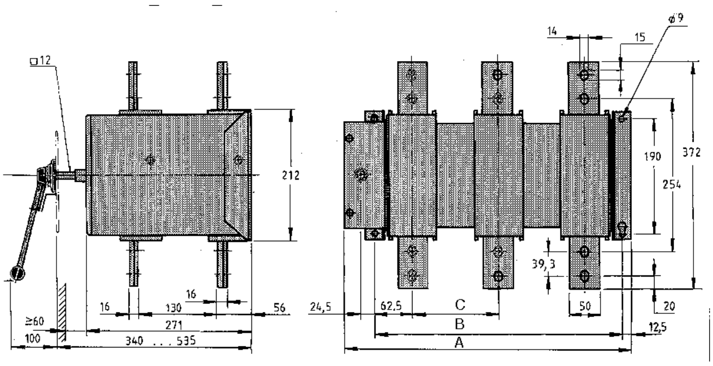


IT 2500K - 3150 K

	IT 2500 K		IT 3150 K	
Pole	III	IV	III	IV
A (mm)	468	607	468	607
B (mm)	403	542	403	542
C (mm)	139	139	139	139
Poids (kg)	37	47	37	47

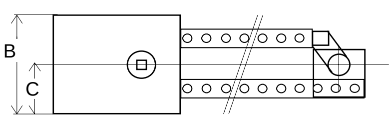
Terminal tightening torque: M12 bolt 50 N.m to 75 N.m

Tightening torque for switches: M8 screw 11 N.m to 22 N.m



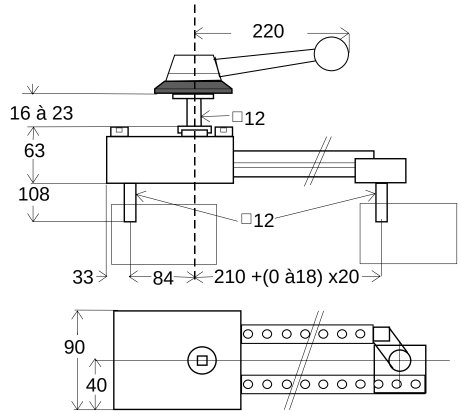
ACCESSORIES FOR OUTSIDE CONTROL

VI and VIII pole system:
P 097 119: for IT 1000K to 1600 K



Order with F 099549 handle
and an additional shaft.

Reversing system 1-0-2: handle supplied
B 092595: for IT 1000 to 1600K



Reference #	Switch model	Weight
B 092599	IT 1000 à 1600 K	4,50kg

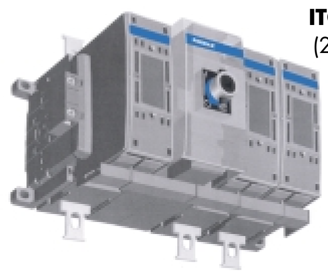
NOTE: Weights without accessories; tightening torques of switches depend on quality of bolts.

For Ferrule Fuses

ITC

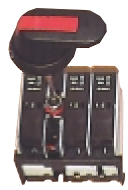
FUSED SWITCH-DISCONNECTORS
FOR FERRULE FUSES
ITC 32 - 50 - 125 A

- **CONTROL:** SIDE OR FRONT HANDLE
  PADLOCKABLE IN OFF-POSITION WITH 3 PADLOCKS.
  SAFE AND RELIABLE INDICATION OF POSITION ON HANDLES.
- **INTERRUPTING:** TWIN INTERRUPTING PER PHASE
  FUSE IS COMPLETELY ISOLATED WHEN POSITION IS OFF
  AC23 & DC23 ON-LOAD SWITCHING AND CLOSING
  INTERRUPTING RATING: 25 TO 50
  INSULATION VOLTAGE: 1 000 V
- **MECHANISM:** SNAP.
- **FIXATION:** ON DIN RAIL
  ON-BOARD OR ON-FRAME FOR CUBICLE
  BACKGROUND
- **CONSTRUCTION :** COMPLYING WITH IFC 947 1&3 AND EN 60 947.
  PROTECTION DEGREE (WITH ACCESORIES): IP 2X.
  PROTECTION FOR ANY CLIMATE.
  SILVER-PLATED COPPER ELECTRIC CONTACTS.
  ISOLATING PARTITIONS MADE WITH UL 94 VO MATERIALS.
  PRE-ISOLATING AND BLOWN FUSE INDICATION AS ACCESSORIES.

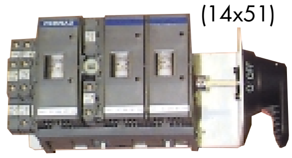


ITC 125
(22x58)

ITC 32
(10x38)



ITC 50
(14x51)



MAIN ELECTRICAL CHARACTERISTICS

			ITC 32A	ITC 50A	ITC 125A
Rated operational current at ambient Rated operational current under cover	40°c (1) 40°c	Ith Ithe	32 32	50 50	125 125
Rated insulation voltage (Ui). Pollution class 3		V	1000	1000	750
Rated operational voltage AC-20 DC-20 Rated impulse withstand voltage		V kV	1000 12	1000 12	750 12
Fuse Size Max power loss / fuse to Ith (2)		W	10 x 38 3	14 x 51 7,5	22 x 58 12
RMS Prospective short-circuit current with aM or gG class FerrazShawmut Fuses. Fuses Rating Permissible peak let-through current		kA A kA	25 32 6	50 50 14	50 125 14
Rated operating current AC-21-A / AC-22-A	500 V 690 V	A	32 32	50 50	125 125 *
Rated operating current AC-23-A	500 V 690 V	A	32 32	50 50 *	100 50 *
Rated operating power Ac-23 (kW) with a 3-phase 1,500 rpm standard asynchronous motor at	400 V 500 V 690 V	kW	14 18 25	25 33 45	55 70 45
AC-23 Interrupting rating : Ic at cosφ = 0.35) under rated operating voltage (Ue)	500 V 690 V	A	256 256	504 504	800 405
DC-23-A rating operating current/ poles in series** for	110-220 V 440 V 500-750 V	A	32/2 32/4	consult us	125/3 100/4 * ....
RMS permissible short duration (1.5) rated current		kA	1	2,5	5
Mechanical endurance : operation cycles number (1 cycle = 1 opening + 1 closing of contacts)			10 000	10 000	10 000
Electrical endurance : operation cycles number at le and cosφ 0.65	500 V 690 V		 1500	....	1500 *** ....
Power loss per pole (without fuses)		W	2	2,5	5

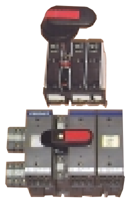
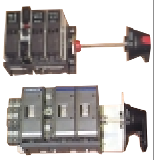
(1) For ambient temperature 50°C : x 0.9 - 60°C : x 0.8 ; for horizontal fuse : x 0.9. * Use in class B ** To be achieved by user *** Test at 100 A

For Ferrule Fuses

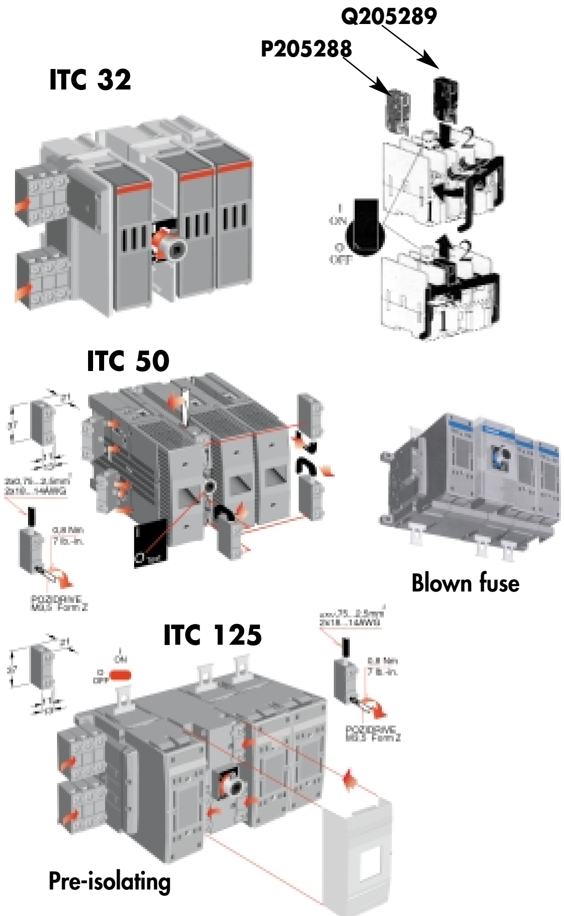
ITC

STANDARD SWITCHES

The following items are supplied separately.
For additional adaptations refer to Accessories section and order selected reference numbers.

			Pole	Catalog #	Reference #
FRONT		**10x38** 32 A	3 4 4	ITC 32 III 10x38 ITC 32 III+N 10x38 ITC 32 IV 10x38	J 205283 K 205284 L 205285
		14x51 50 A	3 4	ITC 50 F III 14x51 ITC 50 F IV 14x51	Y 209896 Z 209897
		22x58 125 A	3 4 4	ITC 125F III 22x58 ITC 125F III+N 22x58 ITC 125F IV 22x58	L 210782 M 210783 N 210784
SIDE		**10x38** 32 A	3 4	ITC 32 M III 10x38 CDE LAT ITC 32 M IV 10x38 CDE LAT	F 210087 G 210088
		14x51 50 A	3 4	ITC 50 FS III 14x51 CDE LAT ITC 50 FS IV 14x51 CDE LAT	D 209901 E 209902
		22x58 125 A	3 4	ITC 125 M III 22x58 CDE LAT ITC 125 M IV 22x58 CDE LAT	P 210785 R 210787

MOUNTING OF PRE-ISOLATING AND BLOWN FUSE-INDICATOR MICROSWITCH



MICROSWITCH CHARACTERISTICS

	Minimum for safe operation	Maximum for operation in AC 12	Applications
②P 205288 ②Q 205289 ②R 205290	24 V 25 mA AC / DC	24V - 6A DC12 440V - 2A AC15	Single microswitch standard Twin microswitch standard
①H 209882 ①L 207493		690V - 2A AC15	

①Single microswitch, NO or NC ②Single microswitch reversinbg, NO/NC
③2 single microswitches, 1 NO and 1 NC ④Twin microswitch reversing, two NO/NC

CONTROL HANDLE BULK

Insulating, padlockable inside front handle

Handle reference #	Switch model	A mm	B mm	C mm	Weight mm	Figure
N 205287	ITC 32	40	50	22	0,1kg	1
E 210109	ITC 50 & 125	50	70	20	0,15kg	2

Figure 1

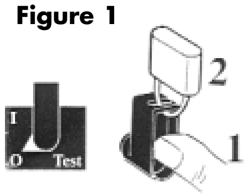
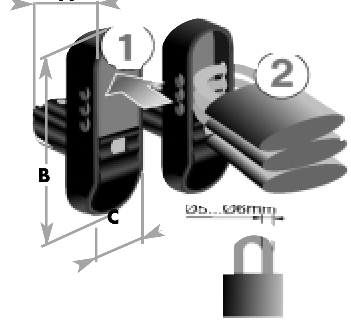


Figure 2



For Ferrule Fuses

ITC

ACCESSORIES

Pre-isolating microswitch Single microswitch ① One contact NO or NC ② Reversing (NO/NC) Code	Signalisation fusion fuse Single microswitch ③ One contact NO + one contact NC ② Reversing (NO/NC) Code	Protection against live terminal touching ✪One shroud upstream and one downstreaml For protection upstream and dowstream order two pieces Code	Protection against fuse touching Code	Inside handle padlockable See control handle bulk Code	Outside handle padlockable suplied with shaft Distance between switch and handle See bulk Black (Red and Yellow) Code	Shaft extension Distance max. between switch and handle is - 60 mm compare with the shaft length L Code	Size	CONTROL
②P 205288(NO/NC) or G210663+ ① H 209882(NC) ① L 207493(NO)	② Q 205289 ② R 205290 ② R 205290	Original	Original	N 205287	V 209916 (C 210084)	H 081703 (L = 265 mm)	10x38 32 A	FRONT
① H 209882(NC) ① L 207493(NO)	③ Z 210104 ③ A 210105	Original	Original	E 210109	M 209909 (N 209910)	B 210106 (L = 290 mm)	14x51 50 A	FRONT
① H 209882(NC) ① L 207493(NO)	A 210473	N 210807	Original	E 210109	M 209909 (N 209910)	C 210107 (L = 430 mm)	22x58 125 A	FRONT
②P 205288(NO/NC)	② Q 205289 ② R 205290	Original	Original	Order a front control switch	A 210082 (B 210083)	H 081703 (L = 265 mm)	10x38 32 A	SIDE
① L 207493(NO) ① H 209882(NC)	③ Z 210104 ③ A 210105	Original	Original		D 210085 (E 210086)	B 210106 (L = 290 mm)	14x51 50 A	SIDE
① L 207493(NO) ① H 209882(NC)	A 210473	N 210807 (1 per terminal)	Original		D 210085 (E 210086)	C 210107 (L = 430 mm)	22x58 125 A	SIDE

CONTROL HANDLE BULK

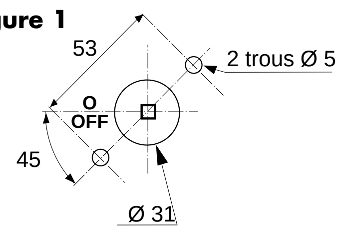
Insulating, padlockable outside front handle

Handle Ref. Number	Switch model	L mm	■ mm	Weight kg	Fig.
V 209916 C 210084	ITC 32	65	5	0,1	1
M 209909 N 209910	ITC 50F ITC 125F	80	6	0,1	1

Insulating, padlockable outside side handle

Handle Ref. Number	Switch model	L mm	■ mm	Weight kg	Fig.
A 210082 B 210083	ITC 32M	65	5	0,1	2
D 210085 E 210086	ITC 50FS ITC 125M	80	6	0,1	2

Figure 1



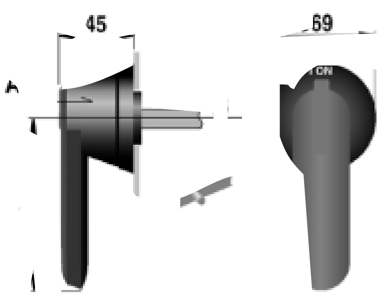
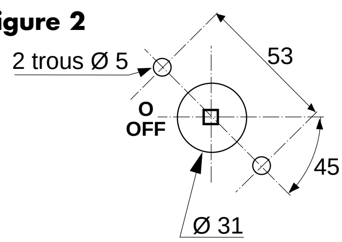


Figure 2



For NH-Style Fuses

ITC

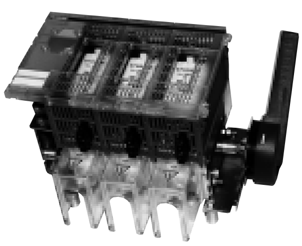
FUSED SWITCH-DISCONNECTOR
FOR NH FUSES
ITC 63 -160 - 250 - 400 - 630 A

- **CONTROL:** SIDE OR FRONT, PADLOCKABLE
IN OFF-POSITION BY 3 PADLOCKS
SAFE AND RELIABLE INDICATION OF CONTACT POSITION
ON HANDLES
- **INTERRUPTION:** DUAL INTERRUPTION PER PHASE
COMPLETE ISOLATION OF FUSE IN OPEN CIRCUIT
ON-LOAD OPENING AND CLOSING: AC 23 AND DC 23
INTERRUPTING POWER: 25 kA A 50 kA.
ISOLATION VOLTAGE: 1000 V.
- **MECHANISM:** SNAP
- **FIXING:** ON DIN RAIL
ON PANEL BOARD
- **CONSTRUCTION:** COMPLYING WITH IEC 947 1&3 AND EN 60 947
PROTECTION INDEX IP 2X
SUITABLE FOR ALL CLIMATE TYPES
SILVER-PLATED COPPER CONTACTS
ISOLATING PARTITIONS IN MATERIAL AS PER UL 94 VO.
PREISOLATING AND BLOWN-FUSE INDICATION ACCESSORIES.

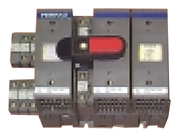
ITC 250



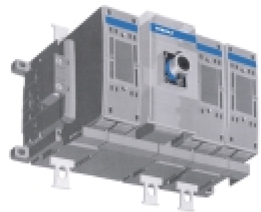
ITC 400



ITC 63



ITC 160



MAIN ELECTRICAL CHARACTERISTICS

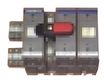
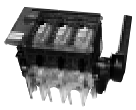
			ITC 63A	ITC 160A	ITC 250A	ITC 400A	ITC 630A
Rated operational current at ambient Rated operational current under cover	40°c (1) 40°c	Ith Ithe	63 63	160 135	250 230	400 360	630 570
Rated insulation voltage (Ui). Pollution class 3		V	1000	750	1000	1000	1000
Rated operational voltage AC-20 DC-20 Rated impulse withstand voltage		V kV	1000 12	750 12	1000 12	1000 12	1000 12
Taille des fusibles Puissance max. dissipée / fusible à Ith (2)		DIN W	00 / 000 7,5	00 12	Size 1 32/27 Ithe	Size 2 45/37 Ithe	Size 3 60/50 Ithe
RMS prospective short-circuit current with aM or gG class FerrazShawmut Fuses. Fuses Rating Permissible peak let-through current		kA A kA	50 63 14	100 160 14	100 250 35	100 400 35	100 630 60
Rated operating current AC-21-A and AC-22-A	500 V 690 V	A	63 63	160 135*	250 250	400 400	630 630
Rated operating current AC-23-A	500 V 690 V	A	63 63*	100 50*	250 250	400 400	630 630
Rated operating power AC-23 in kW with a 3-phase 1.500 rpm standard asynchronous motor at	400 V 500 V 690 V	kW	30 37 60	55 70 45	132 170 230	210 280 330	315 400 540
AC-23 interrupting rating : Ic A at cosj = 0.35 under rated operating voltage (Ue)	500 V 690 V	A	504 504	800 405	2000 2000	3200 3200	5760 5760
DC-23-A rating operating current / poles in series** for	110-220 V 440 V 500-750 V	A	Consult us	160/3 100/4*	250/2 250/2 250/3	400/2 400/2 400/3	630/2 630/2 630/3
RMS permissible short duratiobn (1.5) rated current		kA	2,5	5	8	10	16
Mechanical endurance : operation cycles number (1 cycle = 1 opening + 1 closing of contacts)			10 000	10 000	8 000	8 000	5 000
Electrical endurance : operation cycles number at Ie and cosj 0.65	500 V 690 V		....	1000	 1000	 1000	 1000
Power loss per pole		W	4	9	11	30	55

(1) For ambient temperature 50°C : x 0.9 - 60°C : x 0.8 ; for horizontal fuse : x 0.9. * Use in class B ** To be achieved by user *** Test at 100 A
(2) Valeur donnée pour le courant thermique conventionnel pour un appareil à l'air libre (Ith) et pour un appareil sous enveloppe (Ithe), exemple : coffret de protection.

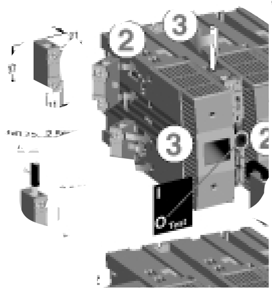
Fused Switches

For NH-Style Fuses — ITC

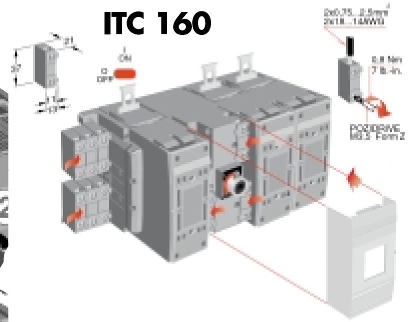
STANDARD SWITCHES The following items are supplied separately. For additional adaptations refer to Accessories section and order selected reference numbers.

		Fuse	Pole	Catalog Number	Ref. Number
FRONT		**00** 63 A	3 4 4	ITC 63D III 00 ITC 63D III+N 00 ITC 63D IV 00	A 209898 B 209899 C 209900
		00 160 A	3 4 4	ITC 160F III 00 CDE Front ITC 160 II+N ITC 160 IV 00 CDE Front	S 210788 T 210789 U 210790
		**DIN 1** 250 A	3 4 4	ITC 250D III T1 ITC 250D III+N T1 ITC 250D IV T1	Q 207290 R 207291 S 207292
		DIN 2 400 A	3 4 4	ITC 400D III T2 ITC 400D III+N T2 ITC 400D IV T2	T 207293 V 207294 W 207295
		DIN 3 630 A	3 4 4	ITC 630D III T3 ITC 630D III+N T3 ITC 630D IV T3	X 207296 Y 207297 Z 207298
SIDE		**00** 63 A	3 4 4	ITC 63DS III 00 CDE LAT ITC 63DS III+N 00 CDE LAT ITC 63DS IV 00 CDE LAT	F 209903 G 209904 H 209905
		00 160 A	3 4	ITC 160M III 00 CDE LAT ITC 160M IV 00 CDE LAT	W 210791 Y 210793
		DIN 1 250 A	3 4 4	ITC 250DM III T1 CDE LAT ITC 250DM III+N T1 CDE LAT ITC 250DM IV T1 CDE LAT	E 208614 F 208615 G 208616
		**DIN 2** 400 A	3 4 4	ITC 400DM III T2 CDE LAT ITC 400DM III+N T2 CDE LAT ITC 400DM IV T2 CDE LAT	H 208617 J 208618 K 208619

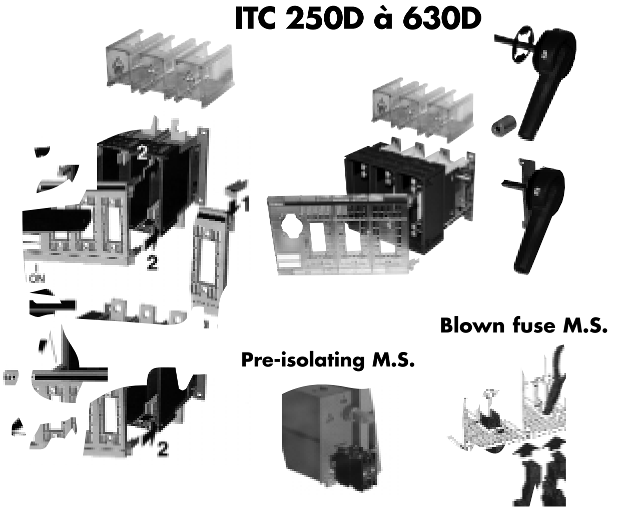
ITC 63



ITC 160



ITC 250D à 630D



Pre-isolating M.S.

Blown fuse M.S.

MICROSWITCHES CHARACTERISTICS

	Minimum for safe operation	Maximum for operation in AC 12	Applications
H 209882 L 207493 S 086 588 L 097 300	24 V 25 mA AC / DC	690 V 2 A cos φ = 0,9	Single-standard microswitch Twin-standard microswitch
J 208020	24 V 10 mA AC / DC	690 V 2 A cos φ = 0,9	Single microswitch: aggressive atmosphere or connection with a programmable machine
Blown-fuse indicator microswitches	24 V 25 mA AC / DC	690 V 2 A cos φ = 0,9	Single-standard microswitch

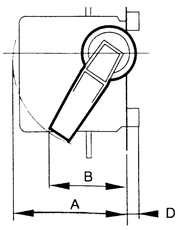
CONTROL HANDLE BULK

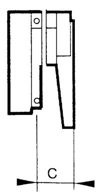
Insulating padlockable inside side handle.

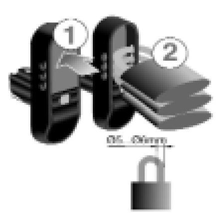
Handle reference #	Switch model	A mm	B mm	C mm	D mm	Weight kg
T 090 936	ITC 250 ITC 400	202	170	100	30	1,2

Insulating padlockable inside front handle.

Handle reference #	Switch model	A mm	B mm	C mm	D mm	Weight kg
E 210109	ITC 63D	50	70	20	XX	0,15







Fused Switches

For NH-Style Fuses ITC

ACCESSORIES

Pre-isolating microswitch **Single microswitch** ①One contact(NO) ou(NC) ②Reversing (NO/NC) ③2 single micro(NO/NC) **Twin microswitch** ④2 reversing (NO/NC) ⑤2x2 single micro(NO/NC) **Bas niveau** ⑥2x2 single micro(NO/NC) Reference #	Blown fuse indicator Reference #	Protection against fuse touching One shroud per terminal Reference #	Protection against fuse touching Reference #	Inside handle padlockable supplied with shaft. See bulk switches. Reference #	Outside handle padlockable supplied with shaft. Distance between switch and handle. See control handle bulk. Black (Red and Yellow) Reference #	Axle extension The maximum distance between the handle and the machine is - 60 mm compare with the shaft length L Reference #	Fuse size and Current rating	
①H 209882 (NC)* ①L 207493 (NO)*	———	Built-in	Built-in	E 210109	M 209909 (N 209910)	B 210 106 (L = 290 mm)	00 63A III III+N IV	CONTROL
①H 209882 (NC)* ①L 207493 (NO)*	———	N 210807 (1 par plage)	Built-in	Take the outside handle with a protection partition against fuses touching	M 209909 (N 209910)	C 210 107 (L = 430 mm)	00 160A III III+N IV	FRONT
③S 086588 ⑤L 097300 ⑥J 208020	III& III+N: A 207299 NO, L 207976 NC IV: B 207300 NO, N 207978 NC	M 096657 (1 par plage)	G 207305 H 207306 H 207306		Q 209912 (R 209913)	L 097093 (L = 395 mm)	DIN1 250A III III+N IV	
	III& III+N: C 207301 NO, L 207976 NC IV: D 207302 NO, N 207978 NC	M 096657 (1 par plage)	J 207307 K 207308 K 207308		Q 209912 (R 209913)		DIN2 400A III III+N IV	
	III& III+N: E 207303 NO, L 207976 NC IV: F 207304 NO, N 207978 NC	S 095880 (1 par plage)	L 207309 M 207310 M 207310		Q 209912 (R 209913)		DIN3 630A III III+N IV	
①H 209882 (NC)* ①L 207493 (NO)*	———	Built-in	Built-in	take the outside front handle	D 210085 (E 210086)	B 210 106 (L = 290 mm)	00 63A III III+N IV	SIDE
①H 209882 (NC)* ①L 207493 (NO)*	———	N210807	Built-in		D 210085 + E 210454 (E 210086 +E 210454)	C 210 107 (L = 430 mm)	00 160A III III+N IV	
③S 086588 ⑤L 097300 ⑥J 208020	III& III+N: A 207299 NO, L 207976 NC IV: B 207300 NO, N 207978 NC	M 096657 (1 par plage)	G 207305 H 207306 H 207306	T 090936 (red)	Y 090940 (red)	P 092979 (L = 380 mm)	DIN1 250A III III+N IV	
	III& III+N: C 207301 NO, L 207976 NC IV: D 207302 NO, N 207978 NC	M 096657 (1 par plage)	J 207307 K 207308 K 207308	T 090936 (red)	Y 090940 (red)		DIN2 400A III III+N IV	

* 8 contacts maxi

CONTROL HANDLE BULK

Insulating padlockable outside front handle

Handle reference #	Switch model	A mm	B mm	C mm	D mm	L mm	■ mm	Weight kg	Fig.
M 209909 N 209910	ITC 63D ITC 160	—	—	45	—	80	6	0,1	1
Q 209912 R 209913	ITC 250D ITC 400D ITC 630D	—	—	45	—	145	12	0,2	1

Insulating padlockable outside side handle

Handle reference #	Switch model	A mm	B mm	C mm	D mm	L mm	■ mm	Weight kg	Fig.
D 210085 E 210096	ITC 63DS ITC 160M	—	—	45	—	80	6	0,1	2
Y 090940	ITC 250DM ITC 400DM	202	170	55	30	145	12	0,75	3

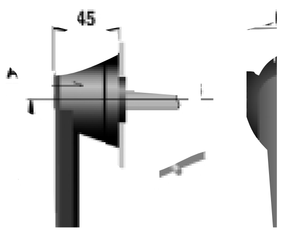


Figure 1

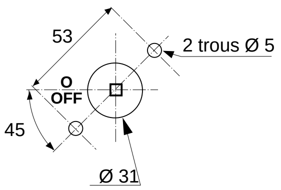


Figure 2

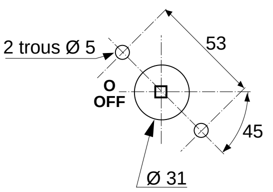
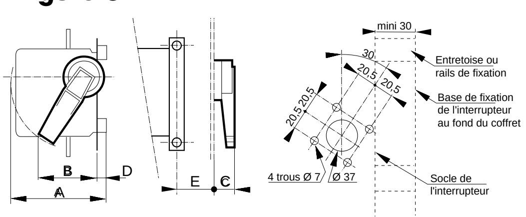


Figure 3



Ferraz Shawmut

For Ferrule Fuses

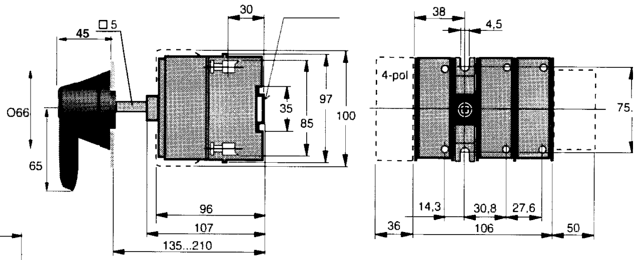
ITC

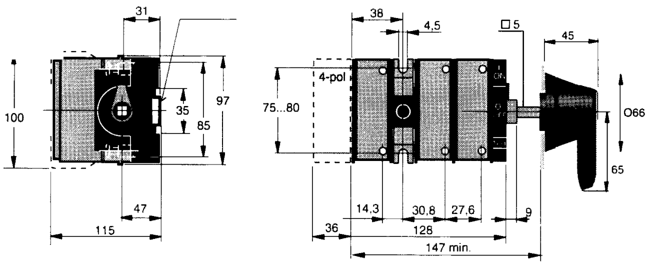
DIMENSIONS AND WEIGHT

ITC 32

	III	III+N	IV
A B	106 156	142 192	142 192
Weight (kg)	0.7	0.9	0.9

Terminal tightening torque: 1.6 to 2.4 Nm
Tightening torque switches: 1.2 to 1.8 Nm
Section of copper cables 0.5 to 10 mm²

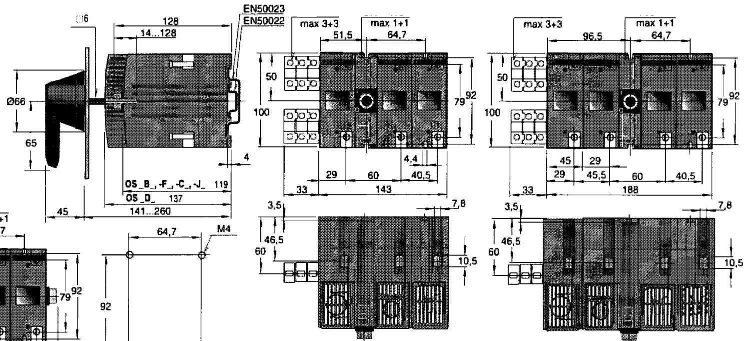


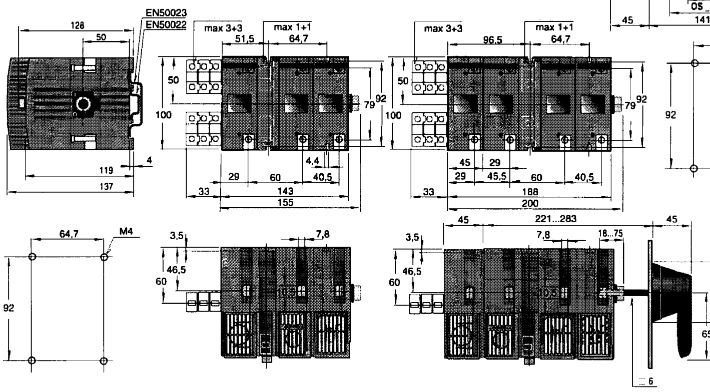


ITC 50

	III	III+N	IV
A B	126 167	158 199	158 199
Weight (kg)	1.6	1.9	1.9

Terminal tightening torque: 4 to 6 Nm
Tightening torque switches: 5 to 7 Nm
Section of copper cables 2.5 to 25 mm²

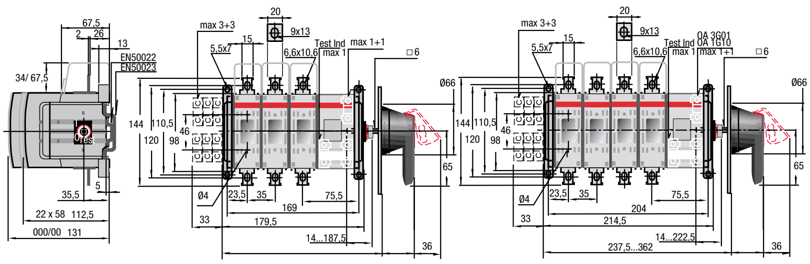


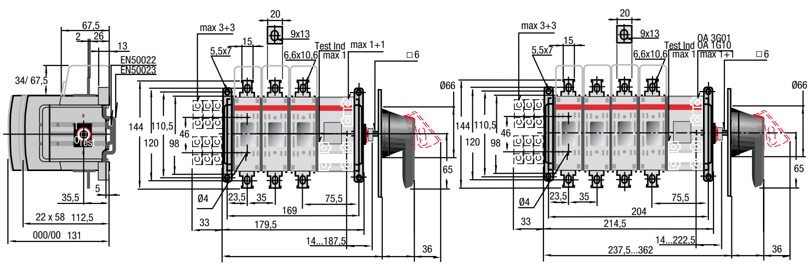


ITC 125

	III	III+N	IV
A B	169 180	204 214	204 214
Weight (kg)	1.9	2.4	2.4

Connection: torque 20 mm with M8 bolt
Terminal tightening torque: 15 to 22 Nm
Switch tightening torque: 5 to 7 Nm





NOTE: Weights without accessories; tightening torques of switches depend on quality of bolts.

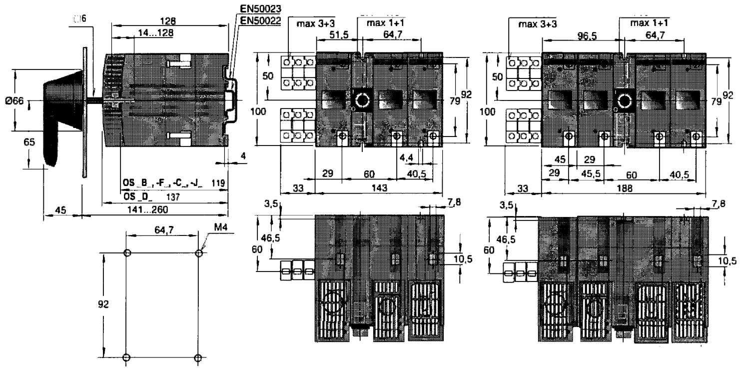
For NH-Style Fuses ITC

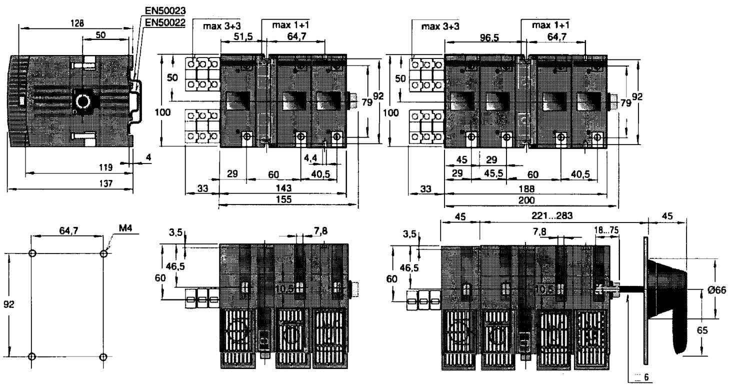
DIMENSIONS AND WEIGHT

ITC 63

	III	III+N	IV
A	126	158	158
B	167	199	199
Weight (kg)	1.6	1.9	1.9

Terminal tightening torque: 4 to 6 Nm
Switch tightening torque: 5 to 7 Nm
Section of copper cables 2.5 to 25 mm^2

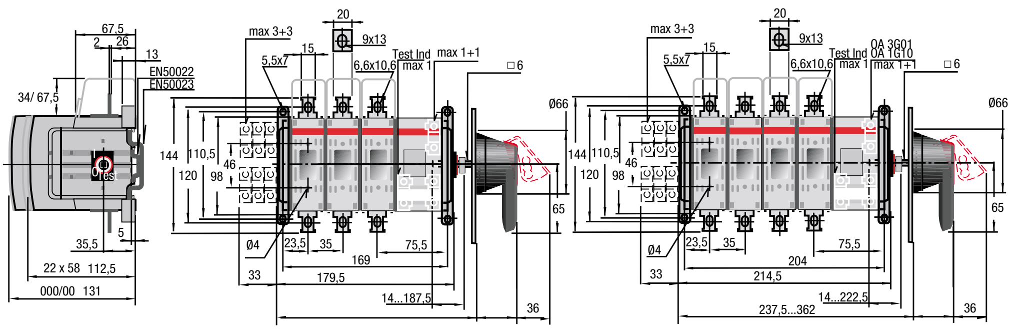


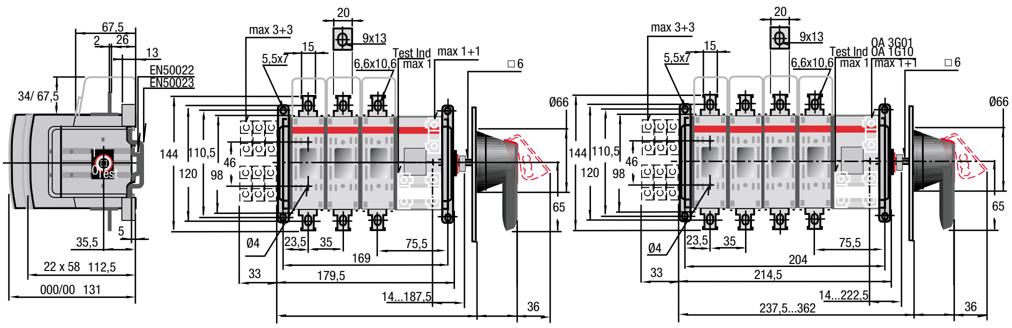


ITC 160

	III	III+N	IV
A	169	204	204
B	156	214	214
Weight (kg)	1.9	2.4	2.4

Terminal tightening torque: 15 to 22 Nm
Connection: torque 20 mm with M8 bolt
Switch tightening torque: 3 to 4 Nm





NOTE: Weights without accessories; tightening torques of switches depend on quality of bolts.

For NH Style Fuses

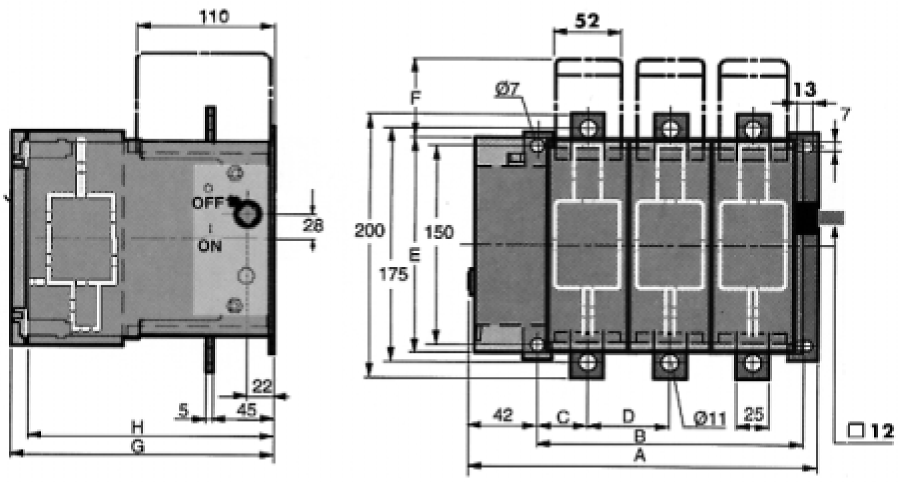
ITC

DIMENSIONS AND WEIGHT

ITC 250/400

	III	III+N	IV
A	262/286	324/356	324/356
B	198/222	260/292	260/292
C	62/70	62/70	62/70
D	37/41	37/41	37/41
E	199/206	199/206	199/206
F	162/180	162/180	162/180
G	60/51	60/51	60/51
Weight (kg)	7/8	8/9	8/9

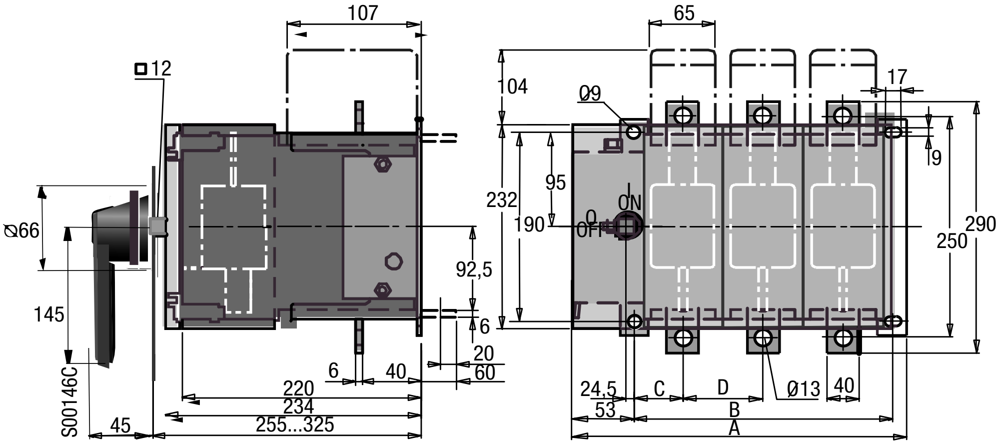
Terminal tightening torque: 30 to 44 Nm
Connection torque 25 mm with M10 bolt
Switch tightening torque: 5 to 7 Nm



ITC 630

	III	III+N	IV
A	343	423	423
B	278	358	358
C	59	59	59
D	80	80	80
Weight (kg)	15.5	19	19

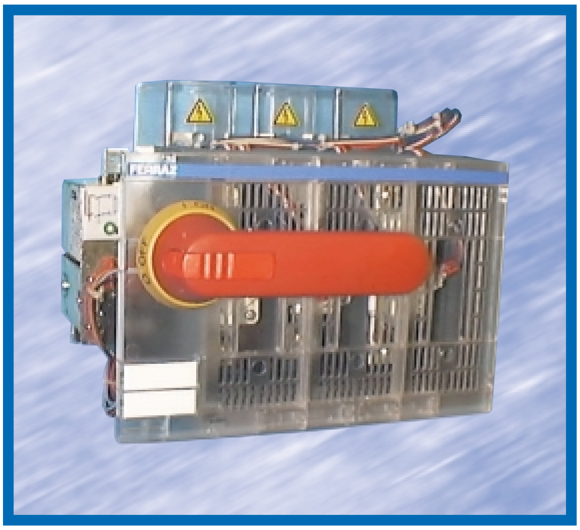
Terminal tightening torque: 50/75 Nm
Connecton: torque 40mm with M12 bolt
Switch tightening torque: 5 to 7 Nm



NOTE: Weights without accessories; tightening torques of switches depend on quality of bolts.

Fused Switches

For Semiconductor Fuses — ITCP



CONTROL:
Side control, padlockable in off position by three padlocks.
Safe and reliable indication of contact position on handles.

SWITCHING:
Double isolation per phase.
Complete isolation of fuse when circuit open.
On-load opening and closing AC23 & DC 23.
Interrupting rating 25 kA up to 100 kA.
Insulation voltage 1000 V.

FIXING:
On DIN rail for ratings lower 250A or on board.

FUSE CONNECTING:
Forced tightening.

MECHANISM:
Snap mechanism independent of user.

CONSTRUCTION:
Complying with IEC 947 183 and EN 60947 Standards
Silver-plated copper electrical contacts.
Insulating partitions in UL 94 UO materials.
Required blown-fuse indication.

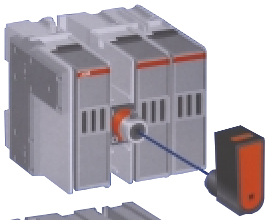
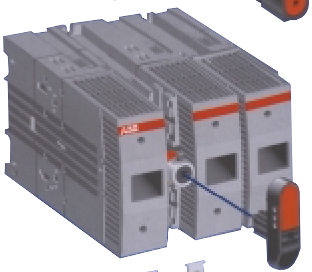
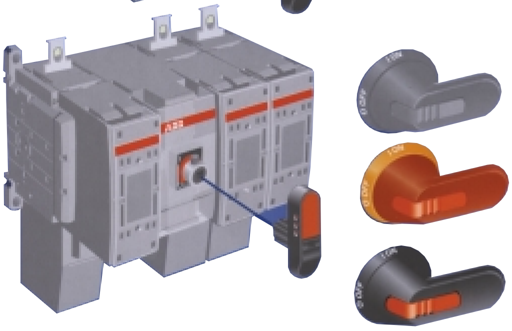
PROTECTION AGAINST TOUCHING OF LIVE PARTS: IP 20

COMPLETE RANGE READY-TO-INSTALL

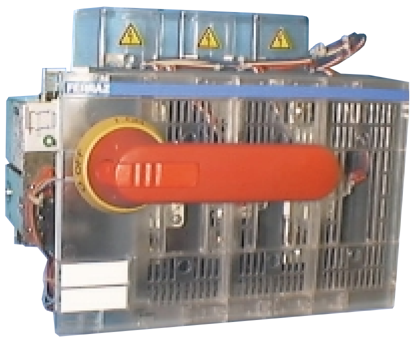
For Semiconductor Fuses

ITCP

Protistor Fuse Switch-disconnectors

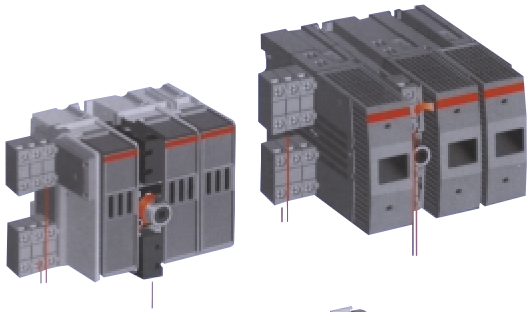
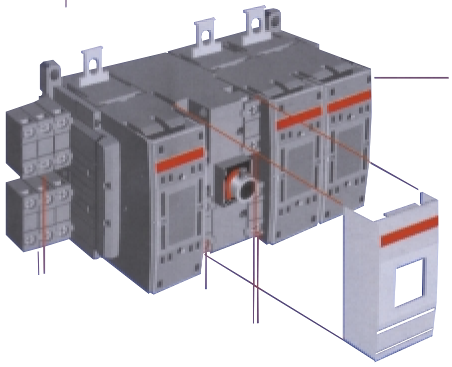




- For 10 x 38 fuses
- For 14 x 51 fuses
- For 22 x 58 fuses
- For 27 x 60 fuses
- For 00 x 000 fuses

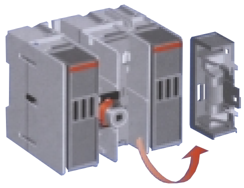
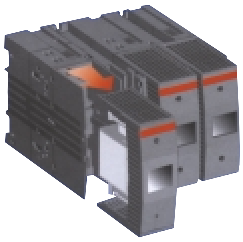
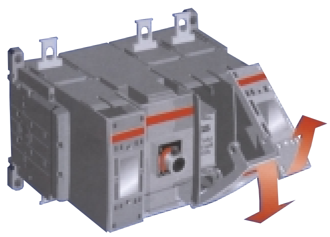


- For 00P & 00TD80 fuses
- For end-contact fuses
- For blade-style Protistor fuses
  DIN 80 - 110 - 140
- For American blade-style Protistor fuses

Easy-to-install and use

Complete protection against touching of live parts

For Semiconductor Fuses ITCP

The ITCP switch-disconnector range is specially designed to satisfy the connection requirements of Protistor semiconductor fuses along with thermal stresses generated during their use.

The combination of ITCP switches and Protistor fuses ensures a high degree of safety in the protection of both personnel and equipment, including power semiconductors and other fragile components.

ITCP Main characteristics

■ Safe switching or closing of circuit at any time, even on load

■ Disconnection of circuit in order to safely service installations and downstream components off load

■ Associated fuses enable protection of the even the most demanding semiconductors

■ Complying with IEC 947-3
BS 5419 - VDE 0660 - NFC 63130 Standards.

■ Silver-plated copper electrical contacts
Interrupting rating as per IEC 947-3, AC 23
Isolation of fuses downstream and upstream: when switch is open, fuses are off load
Protection in all climate types
Molded partitions in self-extinguishing fiber glass-reinforced polyester

■ Front-controlled

■ Numerous accessories (see pages 6 & 7) offer complete protection against casual touch of live parts for improved personnel safety.

■ Designed for fusing with three Protistor fuse technologies:
- ferrule-type fuses
- 00-000 fuses
- PSC series 660V and 1000V fuses (see pages 5 & 6).

■ Thermal rating is given for an ambient temperature <40°c
Beyond this ambient, a derating factor must be applied to thermal rating:

$$\sqrt{\frac{110 - \theta}{70}}$$ where θ is ambient in °C

User advice

While the rating alone enables selection of the switch-disconnector for general purpose fuses, additional parameters must be taken into account for semiconductor fuses:
- RMS operating current
- Actual power loss through fuse must be lower than maximum dissipable power per fuse in fused switch (see pages 4 & 5).

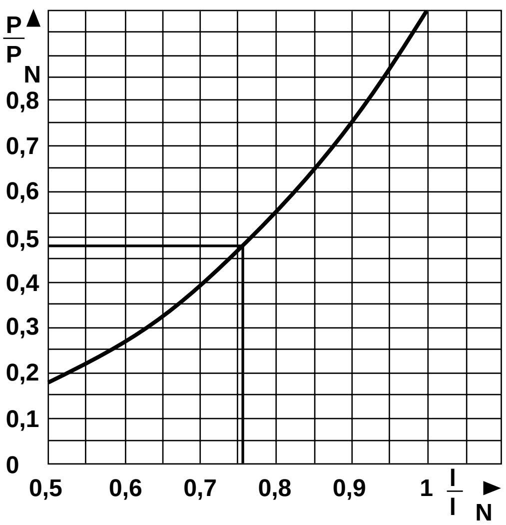
ITCP Selection example

Assume that fuse determination, in accordance with our T59 application information document, results in selection of a PSC 660V size 31 with I_N = 450A and 70W rated power.

Operating conditions will be as follows:
- open air installation, ambient 30°C
- vertically-assembled fuses
- I rms = 340 A

Calculated power loss through fuse:

$$\frac{I\ rms}{I_N} = \frac{340}{450} \sim 0.76$$



In Semiconductor Fuses section, curve $P/P_N = f(I/I_N)$ provides a 0.48 coefficient, thus power lost in fuse is:
P = 0.48 x 70W = 33.6W

Various possibilities:

1[st] case: fuse with end contacts TT

(1) ITC P 400 III 30/32 TTF
I rms = 340 A < 400 A
P = 33,6 W < 45 W
(Possible selection)

2[nd] case: fuse with LI blades

(2) ITC P 400 III 30/32 LI
I rms = 340 A < 400 A
P = 33.6 W < 45 W
(Possible selection)

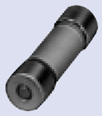
(3) ITC P 630 III 30/33 LI
I rms = 340 A < 630 A
P = 33.6 W < 60 W
(Possible selection)

Conclusion:

Selection #(2) is recommended by Ferraz Shawmut
- easy-to-install fuse
- most cost-efficient solution

For Semiconductor Fuses ITCP

Selection Table: ITCP Thermal Rating vs fuse type

ITCP Thermal Rating (Open air, Ambient 40°C)	Maximum Power loss in fuse	For PROTISTOR® fuses													
		 Ferrule (1)				 00 - 000 (2) Solid Blades	Brackets	 End-contacts PSC (3)							
		10 x 38	14 x 51	22 x 58	27 x 60	00P	00TD80	30TT	31TT	32TT	33TT	70TT	71TT	72TT	73TT
32 A	3,5 W @ Ith 3,5 W@ Ithe	**B210405** *J205283*													
50 A	7,5 W @ Ith 7,5 W @ Ithe		**C210406** *Y209896*												
125 A	12 W @ Ith 12 W @ Ithe			**D210407** *L210782*											
160 A (135)*	12 W @ Ith 9 W @ Ithe				**E210408** *B210888*	**F210409** *S210788*									
250 A (230)*	32 W @ Ith 23 W @ Ithe						**G210410** *X210125*	**H210411** *Y210126*	**H210411** *Y210126*			**J210412** *Z210127*	**J210412** *Z210127*		
400 A (360)*	45 W @ Ith 34 W @ Ithe*						**M210415** *C210130*	**N210416** *D210131*	**N210416** *D210131*	**N210416** *D210131*		**P210417** *E210132*	**P210417** *E210132*	**P210417** *E210132*	
630 A (570)*	60 W @ Ith 45 W @ Ithe*							**S210420** *H210135*	**S210420** *H210135*	**S210420** *H210135*		**S210420** *H210135*	**S210420** *H210135*	**S210420** *H210135*	
800 A (720)*	65 W @ Ith 55 W @ Ithe*							**W210423** *M210139*	**W210423** *M210139*	**W210423** *M210139*	**W210423** *M210139*	**W210423** *M210139*	**W210423** *M210139*	**W210423** *M210139*	**W210423** *M210139*

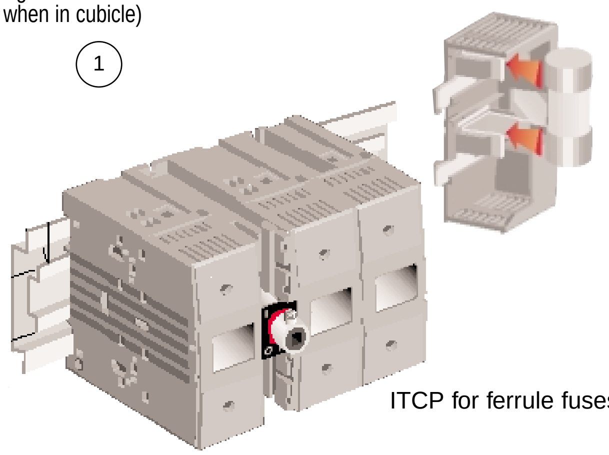
In bold letters: Switch plus accessories to be mounted (switch + connection kit + inside control + protection against fuse live parts touching + protection against terminal touching + pre-isolating microswitch).

In Italics : Switch - Accessories must be ordered separately (see following page).

@ Ith : value given at switch thermal rating

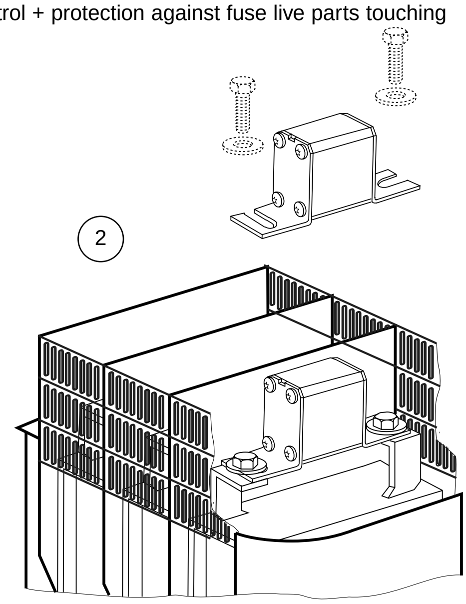
@ Ithe : value given for a shrouded switch (as when in cubicle)

(1)



ITCP for ferrule fuses

(2)

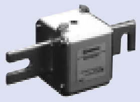
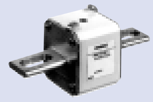


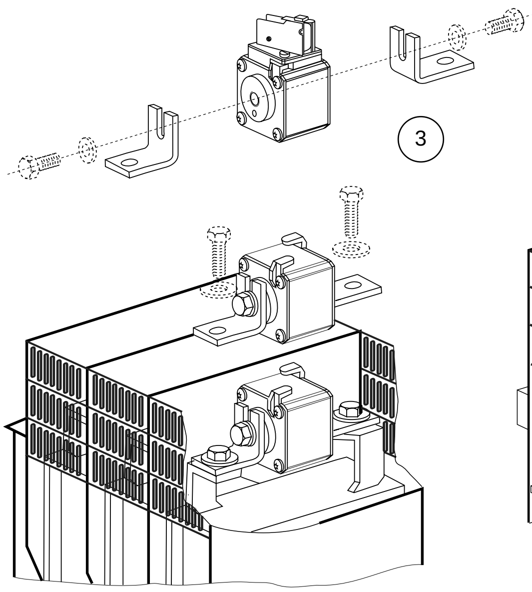
ITCP for bracket-style 00 & 000 fuses

For Semiconductor Fuses

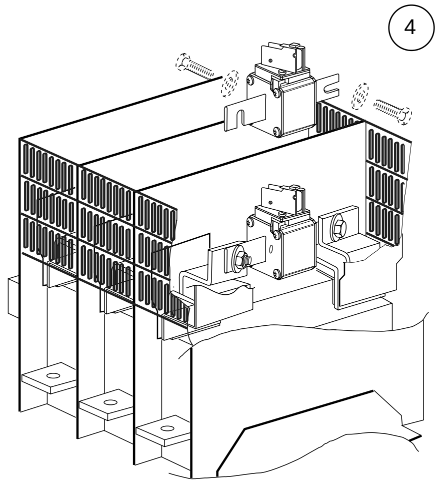
ITCP

For PROTISTOR® fuses

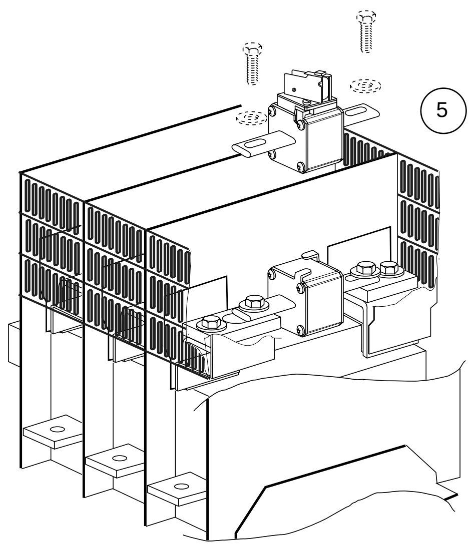
 German range PSC (4)				 American range PSC (5)							
				Long blades				Short blades			
30-70 DIN 110	31-71 DIN 110	32-72 DIN 110	33-73 DIN 110	30LI	31LLI	32LI	33LI	70KI	71KI	72KI	73KI
K210413 A210128	**K210413** A210128			**L210414** B210129	**L210414** B210129			**L210414** B210129	**L210414** B210129		
Q210418 F210133	**Q210418** F210133	**Q210418** F210133		**R210419** G210134	**R210419** G210134	**R210419** G210134		**R210419** G210134	**R210419** G210134	**R210419** G210134	
T210421 L210138	**T210421** L210138	**T210421** L210138		**V210422** K210137	**V210422** K210137	**V210422** K210137		**V210422** K210137	**V210422** K210137	**V210422** K210137	
X210424 Q210142	**X210424** Q210142	**X210424** Q210142	**X210424** Q210142	**Y210425** P210141	**Y210425** P210141	**Y210425** P210141	**Y210425** P210141	**Y210425** P210141	**Y210425** P210141	**Y210425** P210141	**Y210425** P210141



ITCP for end-contact fuses



ITCP for DIN-blade fuses



ITCP for American-blade fuses

For Semiconductor Fuses

ITCP

		Ready-to-install complete switch**		Separate switch with kit for connecting fuses		
Thermal Rating Ith (A)	Fuse Type	Complete switch Reference Number	Catalog Number Switch supplied with black & red handle, 2 auxiliary pre-isolating contacts NO & NC, blown fuse indication for ferrule fuses and protection against terminal touching	Separate Switch Reference Number	Connection kit Reference Number	Switch plus mounted connection kit Reference #
32	10x38	B 210 405	ITCP 32 III 10x38 COMPLETE	J 205 283	...	...
50	14x51	C 210 406	ITCP 50 III 14x51 COMPLETE	Y 209 896	...	...
125	22x58	D 210 407	ITCP 125 III 22x58 COMPLETE	L 210 782	...	...
160	27x60	E 210 408	ITCP 160 III 27x60 COMPLETE	B 210 888	...	...
	00P	F 210 409	ITCP 160 III 00 COMPLETE	M 096 542	...	...
250	00T DIN 80	G 210 410	ITCP 250 III 00/000 TD08 COMPLETE	C 210 038	M 210 047	X 210 125
	30 to 31 TTF	H 210 411	ITCP 250 III 30-31 TTF COMPLETE		K 210 045	X 210 126
	70 to 71 TTF	J 210 412	ITCP 250 III 70-71 TTF COMPLETE		L 210 046	Z 210 127
	30 to 31 DIN 110 70 à 71 DIN 110	K210 413 #	ITCP 250 III 30-31/70-71 D11 # COMPLETE		H 210 043	A 210 128 #
	30 to 31 LI 70 à 71 KI	L210 414	ITCP 250 III 30-31 LI/70-71 KI COMPLETE		N 210 048	B 210 129
400	00T DIN 80	M 210 415	ITCP 400 III 00/000 TD08 COMPLETE	D 210 039	M 210 047	C 210 130
	30 to 32 TTF	N 210 416	ITCP 400 III 30-32 TTF COMPLETE		K 210 045	D 210 131
	70 to 72 TTF	P 210 417	ITCP 400 III 70-72 TTF COMPLETE		L 210 046	E 210 132
	30 to 32 DIN 110 70 à 72 DIN 110	Q 210 418 #	ITCP 400 III 30-32/70-72 D11 # COMPLETE		H 210 043	F 210 133 #
	30 to 32 LI 70 à 72 KI	R 210 419	ITCP 400 III 30-32 LI/70-72 KI COMPLETE		N 210 048	G 210 134
630	30 to 33 TTF 70 à 73 TTF	S 210 420	ITCP 630 III 30-33/70-73 TTF COMPLETE	E 210 040	Q 210 050	H 210 135
	30 to 33 DIN 110 70 à 73 DIN 110	T 210 421#	ITCP 630 III 30-33/70-73 D08 à 14 COMPLETE		P 210 049	L 210 138 #
	30 to 33 LI 70 à 73 KI	V 210 422	ITCP 630 III 30-33 LI/70-73 KI COMPLETE		S 210 052	K 210 137
800	30 to 33 TTF 70 à 73 TTF	W 210 423	ITCP 800 III 30-33/70-73 TTF COMPLETE	F 210 041	Q 210 050	M 210 139
	30 to 33 DIN 110 70 à 73 DIN 110	X 210 424 #	ITCP 800 III 30-33/70-73 D08 à 14 # COMPLETE		P 210 049	Q 210 142 #
	30 to 33 LI 70 à 73 KI	Y 210 425	ITCP 800 III 30-33 LI/70-73 KI COMPLETE		S 210 052	P 210 141

** Connection parts are not mounted on TTF fuses due to a distance between connection axes depending on height of fuse body variation which is +/- 1mm

In-factory adjustments for DIN 110 blade fuses

For Semiconductor Fuses

ITCP

ACCESSORIES

Inside handle Black & Red (Internal control)	Outside handle ① Black & Red ② Red & Yellow (Internal control)•	Shaft extension for outside handle if needed	Pre-isolating auxiliary contact (MC) ①②③④⑤⑥⑦	Blown fuse indication auxiliary contact (DPMM) ①②③④	Protection against fuse live parts touching (CPT)*	Terminal cover (CB) * 1 CB per terminal
N 205 287	❶ V 209 916 ❷ C 210 084	H 081 703 265 mm shaft	③ P 205 288 ou G 210633 + ① L 207 493 ② H 209 882	③ Q 205 289	Built-in	Built-in
E 210 109	❶ M 209 909 ❷ N 209 910 150 mm shaft	B 210 106 290 mm shaft	① L 207 493 8 contacts maximum ② H 209 882	Z 210 104 (1 NO & 1 NC)	Built-in	Built-in
E 210 109				A 210 473 (1 NO & 1 NC) For 2 NO & 2 NC order L 207 493 H 209 882 NO INDICATION	Built-in	N 210 807
Q 209 912 To be ordered with a protection screen against fuse live part touching	❶ Q 209 912 ❷ R 209 913 250 mm shaft	L 097 093 395 mm shaft	④ S 086 588 ⑤ L 097 300 ⑥ J 208 020	Function of fuse type See Semiconductor Fuse section	If blown fuse indication not selected G 207 305 With blown fuse indication G 207 305 + Y 210 770	* M 096 657
Q 209 912 To be ordered with a protection screen against fuse live part touching	❶ Q 209 912 ❷ R 209 913 250 mm shaft	L 097 093 395 mm shaft	④ S 086 588 ⑤ L 097 300 ⑥ J 208 020	Function of fuse type See Semiconductor Fuse section	If blown fuse indication not selected J 207 307 With blown fuse indication J 207 305 + Y 210 770	* M 096 657
Q 209 912 To be ordered with a protection screen against fuse live part touching	❶ Q 209 912 ❷ R 209 913 250 mm shaft	L 097 093 395 mm shaft	④ S 086 588 ⑤ L 097 300 ⑥ J 208 020	Function of fuse type See Semiconductor Fuse section	Without blown fuse indication L 207 309 With blown fuse indication L 207 309 + Y 210 770	* S 095 880
Q 209 912 To be ordered with a protection screen against fuse live part touching	❶ Q 209 912 ❷ R 209 913 250 mm shaft	L 097 093 395 mm shaft	④ S 086 588 ⑤ L 097 300 ⑥ J 208 020	Function of fuse type See Semiconductor Fuse section	Without blown fuse indication L 207 309 With blown fuse indication L 207 309 + Y 210 770	* S 095 880

• With outside control, a locking mechanism of cover can be used. When switch is ON, this mechanism locks the cover (e.g. test of fuse live part touching protection, servicing of circuit when cubicle open)

Types of auxiliary contacts

① Single microswitch 1 NO
② Single microswitch 1 NC
③ Reversing microswitch 1 NO/NC
④ Microswitch 1 NO & 1 NC
⑤ Twin microswitch 2 NO & 2 NC
⑥ Microswitch 1 NO & 1 NC low level

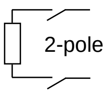
For Semiconductor Fuses

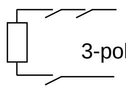
ITCP

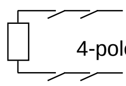
ITCP FUSED SWITCH-DISCONNECTORS

Electrical characteristics		ITCP 32	ITCP 50	ITCP 125	ITCP 160
Thermal rating (1) • open air Ith :	Ith (A)	32	50	125	160
• in cubicle Ithe :	Ithe	32	50	125	160
Rated voltage	AC-20 DC-20 (V)	1000	1000	1000	1000
Rated insulation voltage	Ui (V)	1000	1000	1000	1000
Rated impulse withstand voltage	(kV)	12	12	12	12
PROTISTOR® fuse type	Ferrule	10x38	14x51	22x58	27x60
	00-000	-	-	-	00P
	End-contacts PSC	-	-	-	-
	American PSC	-	-	-	-
	DIN PSC	-	-	-	-
Maximum power losses per fuse #	# (W)	3,5 @ Ith 3,5 @ Ithe	7,5 @ Ith 7,5 @ Ithe	12 @ Ith 12 @ Ithe	12 @ Ith 9 @ Ithe
RMS short-circuit rated current with fuses	500 V (kA)	25	50	50	50
	690 V				
Interrupting rating (AC23) Ic (A) Operating rated voltage:	Ue 500 V	256	504	800	800
	Ue 690 V	256	320	405	405
AC23 Operating rated current Ie (1) Power class	Ie en (A) Ue 500 V	32	50	125	160
	Ie en (A) Ue 690 V	32	50	125	160
AC23 Operating rated power P (kW) with a 1500 rpm asynchronous 3-phase motor	P en (W) Ue 400 V	15	25	55	55
	P en (W) Ue 500 V	18	33	70	70
	P en (W) Ue 690 V	25	45	45	45
AC23 Ue : operating rated voltage					
DC23 Operating rated current / poles in series** (A Operating rated voltage : Ue	Ie (A) Ue 110-220V	32/2	-	125/3	160/3
	Ue 440V	32/4	-	100/4*	100/4*
	Ue 500-750V	-	-	-	-
Mechanical endurance : number of operating cycles		10 000	10 000	10 000	10 000
Electrical endurance : number of operating cycles at Ith and cosφ 0,65	500 V	-	1500	1500	1000
	690 V	1500	-	(I=100A)	-
Power losses per pole (without fusible)	W	2	2.5	12	12
Permissible short-duration current 1s	kA	1	2.5	5	5

** Poles in series: to be completed by user


2-pole in series


3-pole in series


4-pole in series

Fused Switches

For Semiconductor Fuses

ITCP

ITCP 250	ITC 400	ITCP 630	ITCP 800
250 230	400 360	630 600	800 720
1000 1000 12	1000 1000 12	1000 1000 12	1000 1000 12
-	-	-	-
00TD80	00TD80	-	-
30-31 TT - 70-71 TT	30-31TT - 70-71TT	32TT - 72TT	32TT - 33TT 72TT - 73TT
30LI - 31LLI 70KI -71KI	30LI - 31LLI - 32LI 70KI - 71KI - 72KI	30LI - 31LLI - 32 LI 70KI - 71KI - 72KI	30LI - 31LLI - 32LI - 33LI 70KI - 71KI - 72KI - 73KI
30-31 & 70-71 DIN110	30-31-32 & 70-71-72 DIN110	30-31-32 & 70-71-72 DIN110	30-31-32-33 & 70-71-72-73 DIN110
32 @ Ith 23 @ Ithe	45 @ Ith 34 @ Ithe	60 @ Ith 45 @ Ithe	65 @Ith 55 @ Ithe
100 50	100 50	100 50	100 50
2000 2000	3200 3200	5760 5760	5760 5760
200 200 15 170 230	400 400 210 280 330	630 630 315 400 540	720 720 350 470 600
250 /2 250 /2 200 /3	400 /2 400 /2 400 /3	630 /2 630 /2 630 /3	800 /2 800 /2 800 /3
8 000	8 000	5 000	5 000
- 8 000	- 8 000	- 5 000	(cosφ = 0.6) 500
5 8	30 10	55 16	77 16

(1) For ambient 50°C = x0.9, 60°C : x0.8. Pour fusible horizontal : x0.9.
* Use in class B ** To be completed by user
\# Value given at thermal rating, for a switch in open air (Ith) and for a shrouded switch (Ithe) e.g. as in cubicle.

For Semiconductor Fuses

ITCP

DIMENSIONS AND WEIGHT

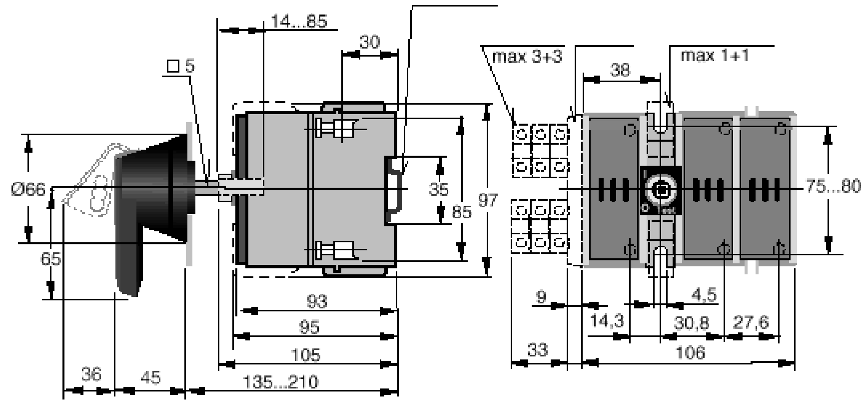
ITC PROTISTOR

ITCP 32 III 10 x 38

Weight: 0.7 kg

Terminal tightening torque:
Mini.: 1.6 N.m • Maxi. 2.4 N.m

Section of copper cables:
0.5 to 10 mm²

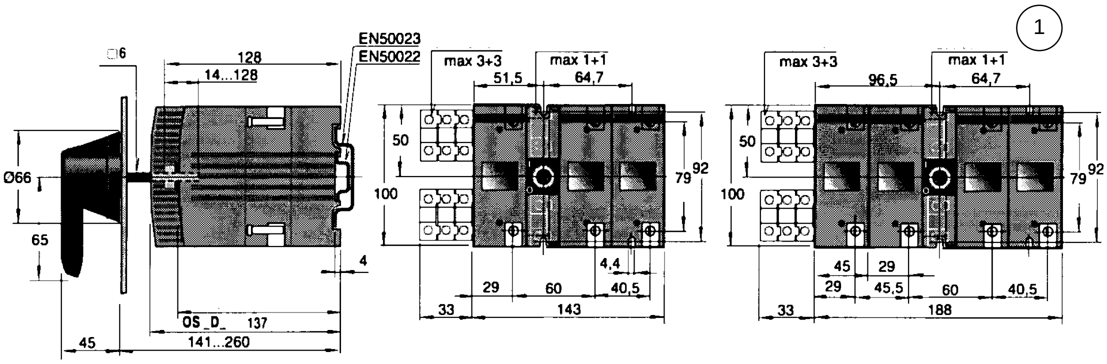


ITCP 50 III 14 x 51

Weight: 1.6 kg.

Terminal tightening torque:
Mini.: 4 N.m • Maxi. 6 N.m

Section of copper cables:
2.5 to 25 mm²

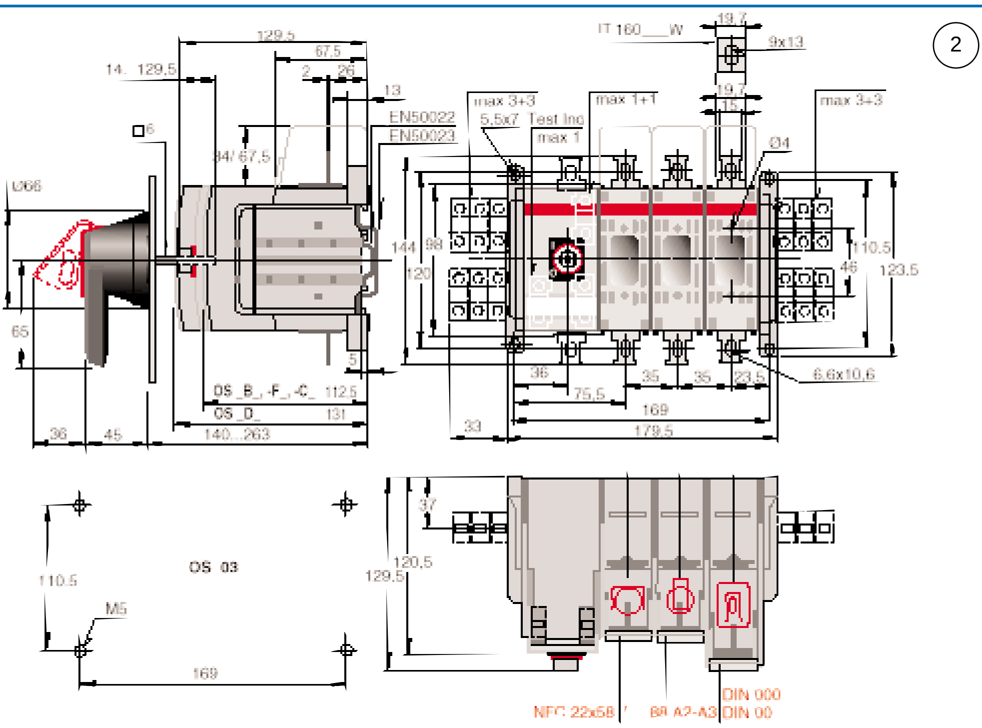


ITCP 125 III 22 x 58
ITCP 160 III 27 x 60
ITCP 160 III 00

Weight : 1.8 kg.

Terminal tightening torque:
Mini.: 5 N.m • Maxi.: 7 N.m

Connection:
torque 20 mm with M8 bolt



Fused Switches

For Semiconductor Fuses

ITCP

TCP 250 III D80
ITCP 250 III 30 LI - 31 LLI
ITCP 250 III 30-31 TTF
ITCP 250 III 70-71 TTF
ITCP 250 III 30-31 DIN 110 /
70-71 DIN 110

Weight: 7 kg.

Terminal tightening torque:
Mini.: 30 N.m • Maxi. : 44 N.m

Connecting:
torque 25 mm per terminal with M10 bolt

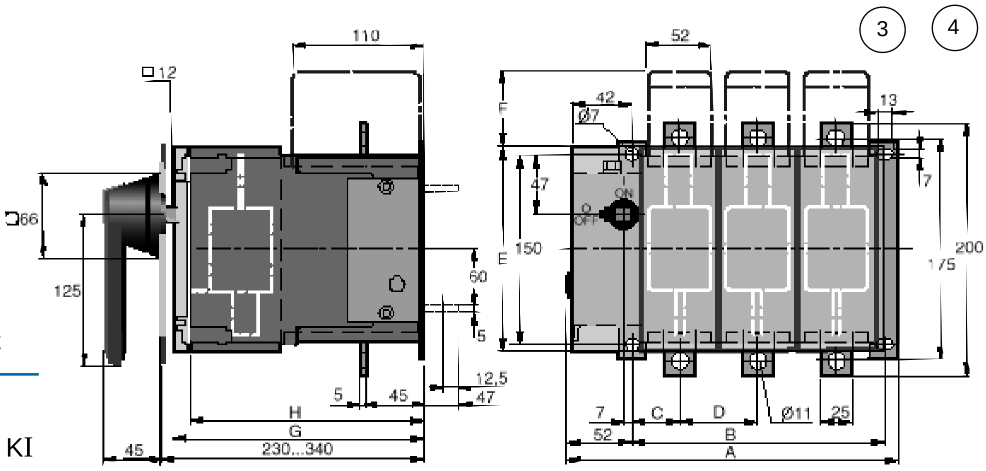
TCP 400 III D80
ITCP 400 III 30-32 LI - 31LLI - 70-72 KI
ITCP 400 III 30-31 TTF
ITCP 400 III 70-71 TTF
ITCP 400 III 30-32 DIN 110 /
70-72 DIN 110

Weight: 8 kg.

Terminal tightening torque:
Mini.: 30 N.m • Maxi. : 44 N.m

Connecting:
torque 25 mm per terminal with M10 bolt

3 4



	A	B	C	D	E	F	G*	H	*With booster
ITCP 250 D III	262	198	37	62	162	60	199	185	G + 41
ITCP 400 D III	286	222	41	70	180	51	206	192	G + 41

* With protection cover against live part touching, and if blown fuse indication auxiliary contacts are used, lenghthening of G is necessary.

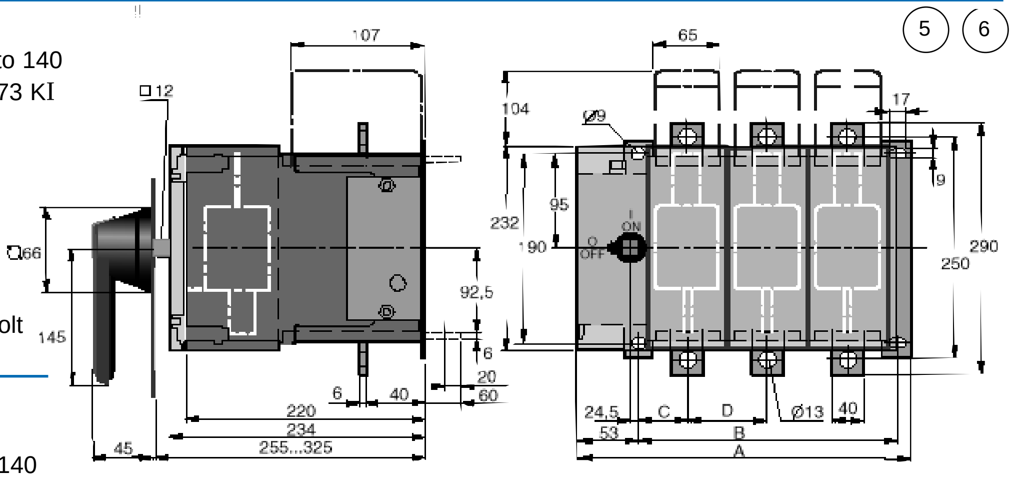
ITCP 630 III 30-33 / 70-73 TTF
ITCP 630 III 30-33 / 70-73 DIN 80 to 140
ITCP 630 III 30-33 LI - 31LLI - 70-73 KI

Weight: 15 kg.

Terminal tightening torque:
Mini.: 50 N.m • Maxi.: 75 N.m

Connecting:
torque 40 mm per terminal with M12 bolt

5 6



ITCP 800 III 30-33 / 70-73 TTF
ITCP 800 III 30-33 / 70-73 DIN 80 to 140
ITCP 800 III 30-33 LI - 31LLI - 70-73 KI

Weight: 19 kg.

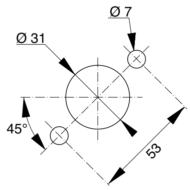
Terminal tightening torque:
Mini: 50 N.m • Maxi. : 75 N.m

Connecting:
torque 40 mm per terminal with M12 bolt

	A	B	C	D	G* With booser
ITCP 630 D III	343	278	59	80	275
ITCP 800 D III	373	308	64	90	275

* With protection cover against live part touching, and if blown fuse indication auxiliary contacts are used, lenghthening of G is necessary.

Drilling diagram for
outside control



7

Thermal and Power Management

Cooling Devices

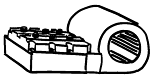
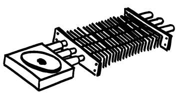
Power Switches

Current Collector Device

Ground Return Current Unit

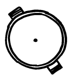
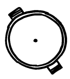
Solutions for cooling

AIR COOLING

Air \ Component to be cooled		Press-Pack: Traditional	Press-Pack: Insulation required	Screwed: 1 component	Screwed: n components
Cooling	Heat sinks (Radiacal) 	**Radiacal** (PAGE 734)		**Radiacal** (PAGE 734)	**Radiacal** (PAGE 734)
Cooling	Heatpipe exchangers (Transcal) 	**Transcal** SC 40 (PAGE 738)	**Transcal** SC 83 / SC 85 SC 89 (PAGE 739)	**Transcal** SC 55 (PAGE 740)	**Transcal** SC 57 (PAGE 741)

Calex-Air for systems (Page 758)

WATER COOLING

Water \ Component to be cooled		Press-Pack: Traditional	Press-Pack: Insulation required	Screwed: 1 component	Screwed: n components
Cooling	Without processing 	Copper **Calistor** (PAGE 749)		Copper **Moducal** (PAGE 744)	
Cooling	Without processing	Stainless steel **Calitube** (PAGE 746)		Stainless steel **Calitube** (PAGE 746)	Stainless steel **Calitube** (PAGE 746)
Cooling	With processing 		Insulated **Calistor**	Aluminum **Moducal** (PAGE 753)	Aluminum **Moducal** (PAGE 753)) **Multical** (PAGE 757)

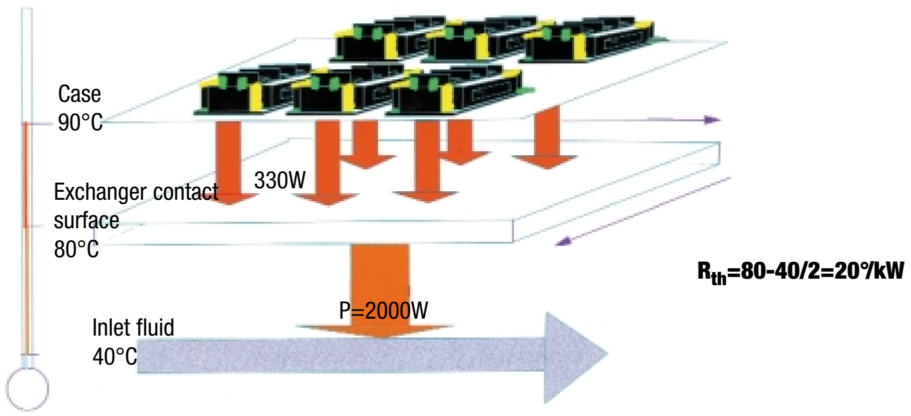
Calex-Water for systems (Page 759)

Thermal and Power Management

Ferraz Date Industries Cooling Devices

General information

1/ Defining Thermal Resistance



Thermal resistance is expressed in °C/kW

$$\text{Thermal Resistance} = \frac{\text{Cooling Device contact Temp. - Inlet Fluid Temp.}}{\text{Power removed from cooling device}}$$

1) A unique characteristic is shown in technical data sheet when component base covers 80 to 100% of cooling surface.
2) For large plates devoted to many components with different dimensions, thermal resistance is only given as an indication. Consult us with dimensions of components used.
3) Our grid-stacking technology (aluminum MODUCAL and CALISTOR) ensures excellent distribution of cooling surface temperature, impossible when using other technologies.

2/ Pressure Drop (DP)

Pressure Drop is expressed in Pascal or millibar according to products.
Characteristics published in our literature take connections and inlet-outlet into account.

3/ Water processing for water cooling devices

Electrical Insulation Required / Water processing	No insulation	Insulation	
		V ≤ 50V	U > 50 V
Tap water (industrial)	Prohibited for Ferraz Data Industries Cooling devices		
Filtered water	Copper Calistor Copper Moducal Stainless steel Calitube (Aluminum prohibited)	Prohibited	Prohibited
Demineralized water	Stainless Steel Calitube Aluminum Calistor Aluminum Moducal Copper Calistor Copper Moducal		Prohibited
Deionized water Resistivity < 2 MΩ.cm	Aluminum Calistor Aluminum Moducal Stainless steel Calitube (Copper prohibited)		Prohibited
Deionized water Resistance > 5 MΩ.cm	Aluminum Calistor Aluminum Moducal Stainless steel Calitube (Copper prohibited)		

Note 1: Never use copper and aluminum in the same cooling circuit.
Note 2: In order to avoid freezing a water glycol mixture is used. The above application table can be applied. Viscosity is higher leading to higher thermal resistance and pressure drop through cooling devices.

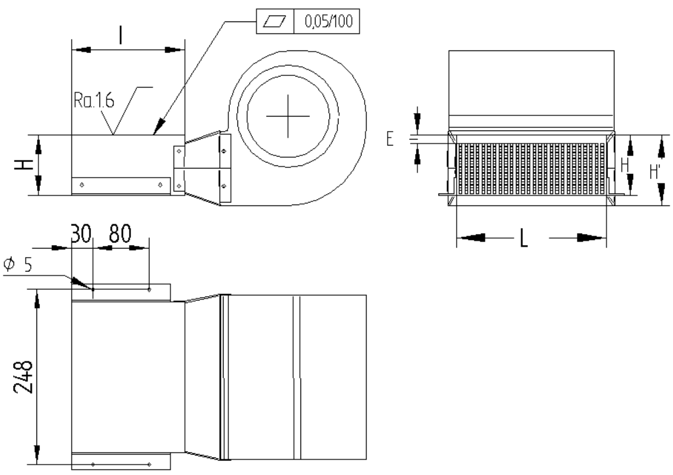
Air Cooling

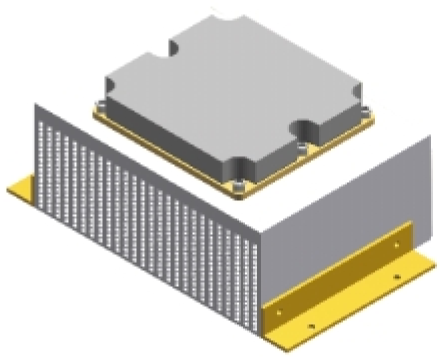
Radiacal

HONEY COMB RADIACAL®

h_{eq} up to 1500 W/m².°C

Compact AIR HEAT SINK
with low thermal resistance
For electronic components, mainly IGBTs and Press Pack



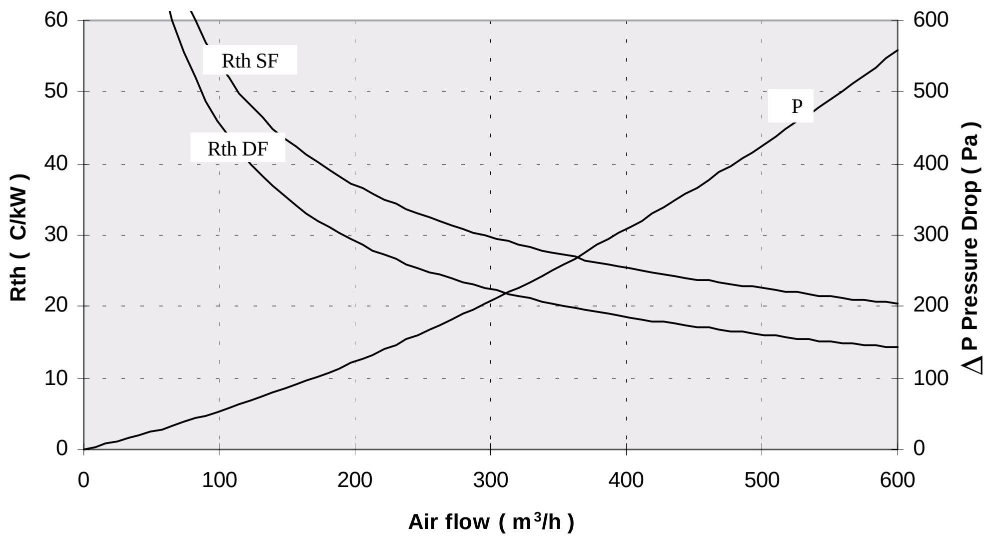


Completely innovative Patented design based on mastery of vacuum brazing.

	L (mm)	l (mm)	H (mm)	H' (mm)	E (mm)	Weight (kg)	Reference number
Simple Side (SF)	210	160	85	-	12	5.5	K210919
Double Side (DF)	210	160	-	97	12	6.5	J210918

OPTIONS:

- ✔ Anchoring clip
- ✔ Customized drill holes on the plate
- ✔ Press Pack assembly
- ✔ Surface protection
- ✔ Cooling fan connected to heat sink
- ✔ Different heights



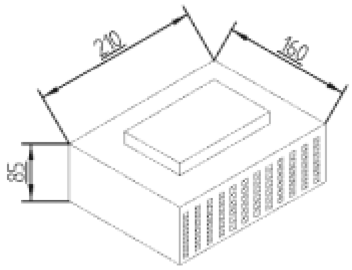
FDI/0300/09 GB

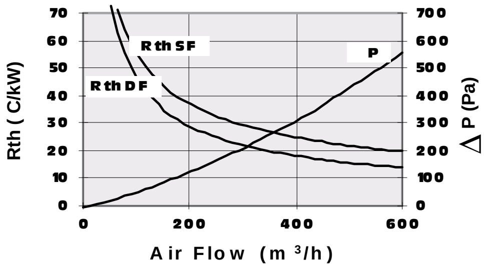
Air Cooling

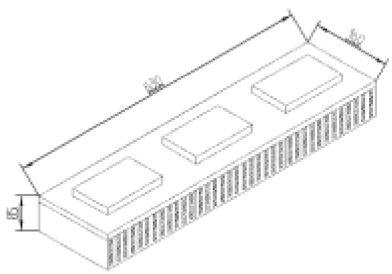
Radiacal

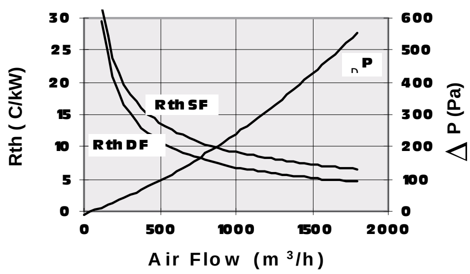
Simple and double side, data on request, dimensions and reference numbers

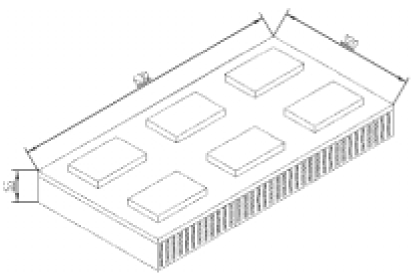
Dimensions	L (mm)	l (mm)	H (mm)	Ref. Numbers	H' (mm)	Ref. Numbers
210x160x85	210	160	85	K210919	97	J210918
210x320x85	210	320	85	Y210954	97	K210965
210x480x85	210	480	85	Z210955	97	L210966
210x640x85	210	640	85	A210956	97	M210967
420x160x85	420	160	85	B210957	97	N210968
420x320x85	420	320	85	C210958	97	P210969
420x480x85	420	480	85	D210959	97	Q210970
420x640x85	420	640	85	E210960	97	R210971
630x160x85	630	160	85	F210961	97	S210972
630x320x85	630	320	85	G210962	97	T210973
630x480x85	630	480	85	H210963	97	V210974
630x640x85	630	640	85	I210964	97	W210975

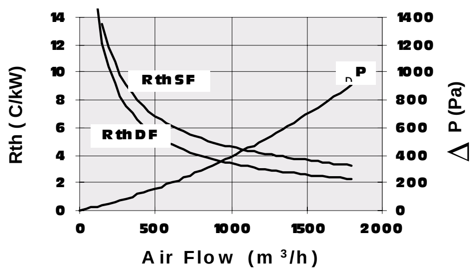








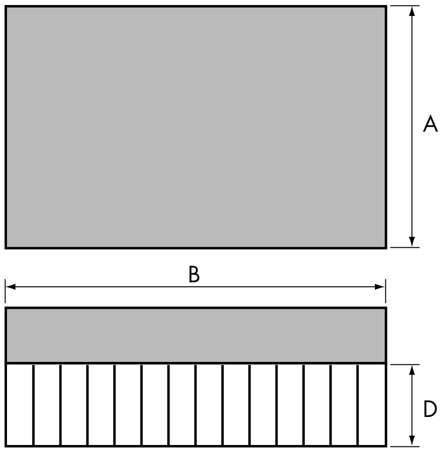




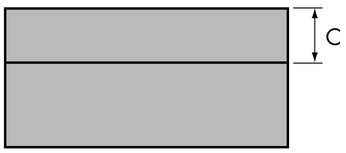
Air Cooling

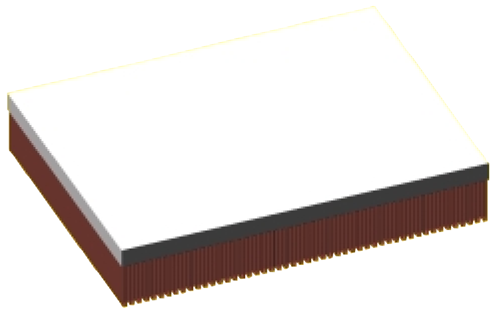
Radiacal®

RADIACAL®
FOR FORCED CONVECTION
h_{eq} = 100 to 700 W/(m2.°C)

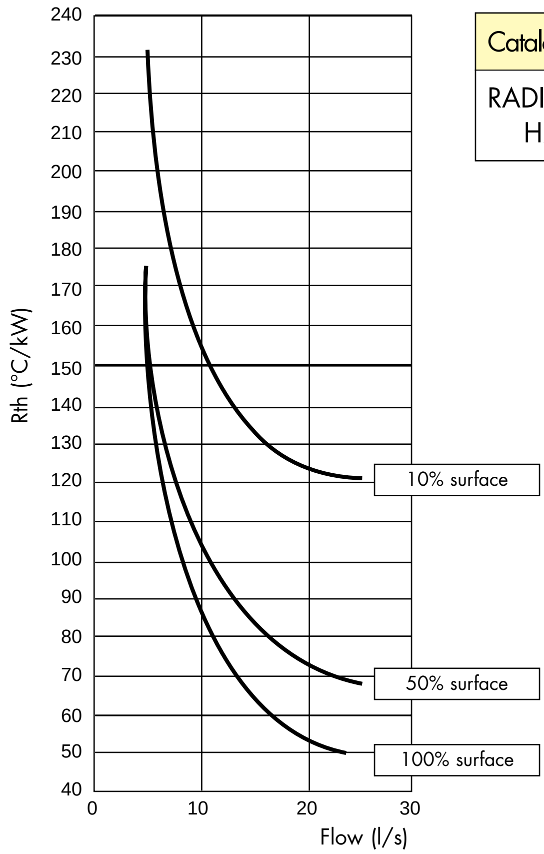


For modules



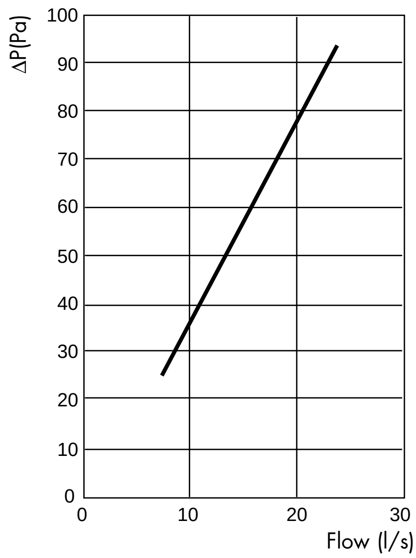


Thermal Resistance



Catalog # / Ref #	A mm	B mm	C mm	D mm	Fin-to-fin width (mm)	Weight Kg
RADIACAL 1520 H225637	150	200	10	25	2	3

Pressure Drop

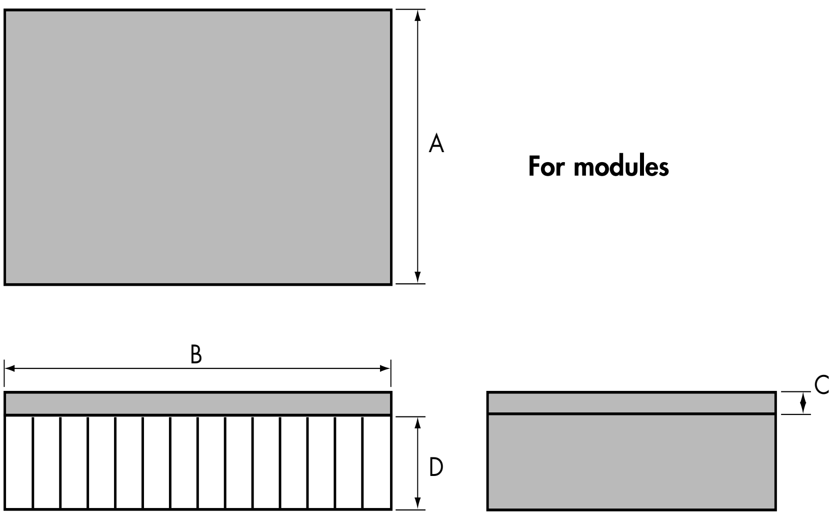


Air Cooling

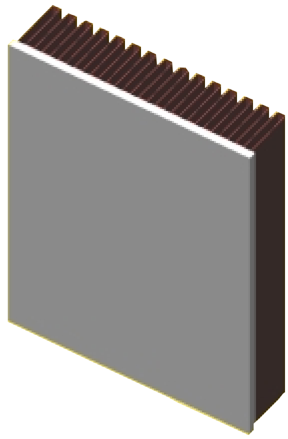
Radiacal®

FOR NATURAL CONVECTION

h_{eq} = 40 to 60 W/(m^2.°C)

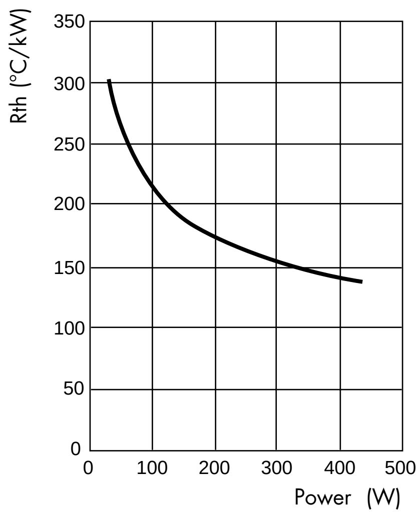


For modules



Catalog # / Ref. #	A mm	B mm	C mm	D mm	Width fin-to-fin mm	Weight Kg
RADIACAL 3040 J225638	400	300	10	65	10	5.7

Thermal Resistance

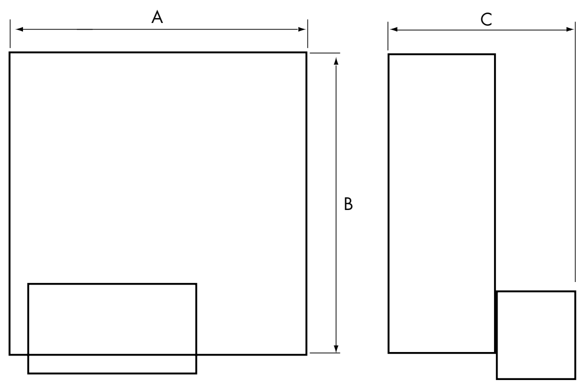


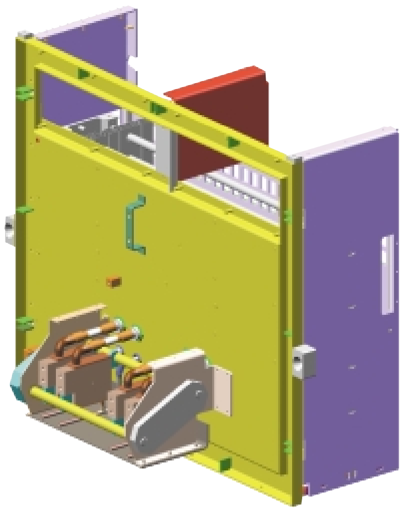
Heat Pipe Exchangers

Transcal®

INSULATED TRANSCAL® SC 40
FOR NATURAL CONVECTION
h_{eq} = 200 to 800 W/(m2.°C)

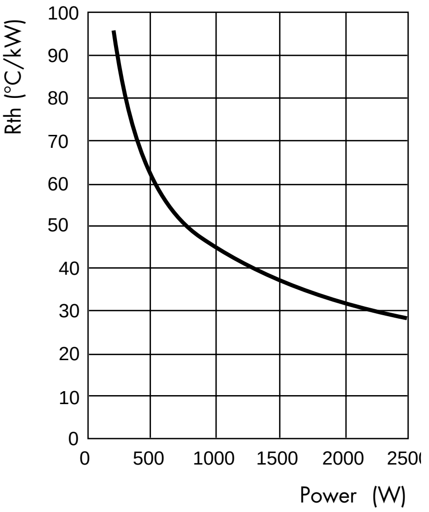
For Press-Pack 2" to 3"





Catalog # / Ref. #	Insulation (kV @ 50 Hz 1 min)	A (mm)	B (mm)	C (mm)	Weight Kg
SC 40 / Consult us	9.5	595	510	538	40

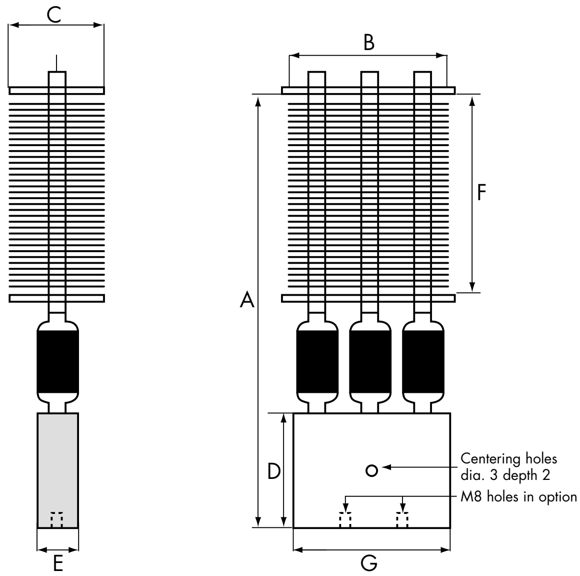
Thermal Resistance

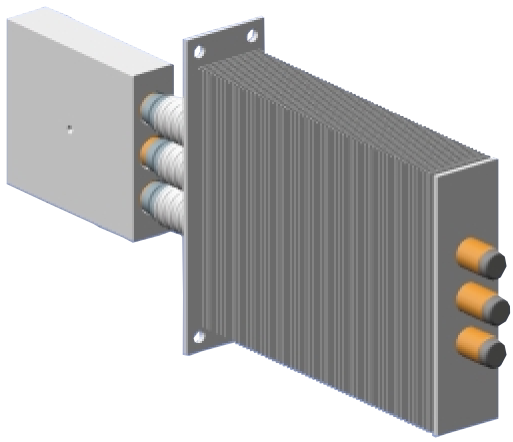


Heat Pipe Exchangers Transcal®

INSULATED TRANSCAL® SC 83, SC 85,SC 89
heq = 300 to 1100 W /(m²°C)

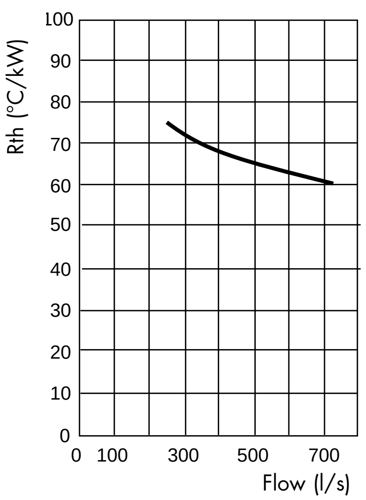
FOR PRESS-PACK 3”





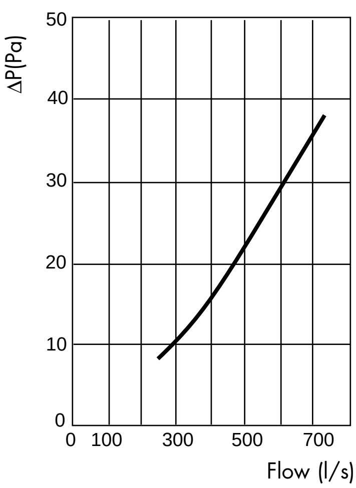
Catalog # / Ref. #	Insulation (kV (kV @ 50 Hz 1 min)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	Weight Kg
TRANSCAL SC 83 / Q206807	6	385	170	40	100	26	188	140	1.45
TRANSCAL SC 85 / J209469	12	400	170	60	90	30	200	170	3.30
TRANSCAL SC 89 / V209456	5	445	170	50	90	26	140	140	4.00

SC 89 THERMAL RESISTANCE



Rth for a 1300 W dissipated power

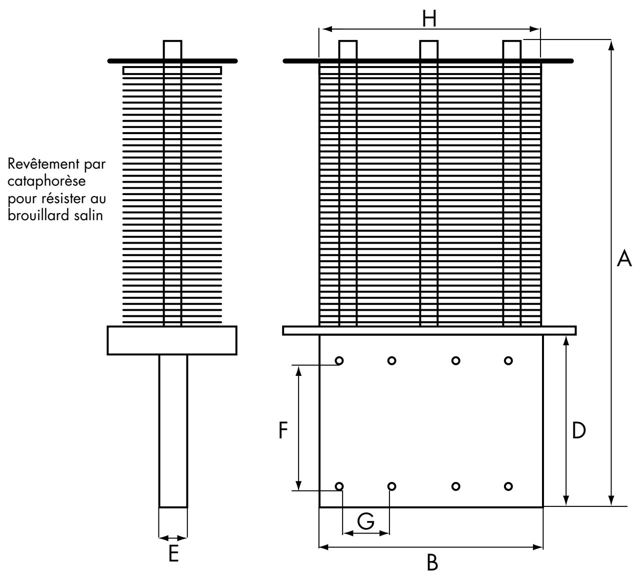
SC 89 Pressure drop

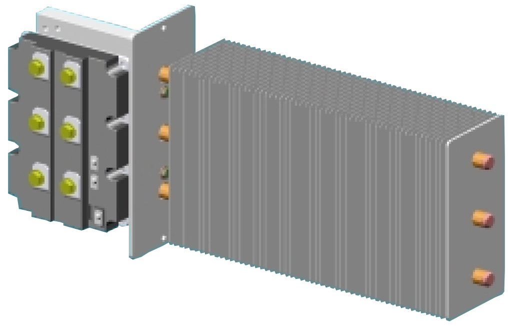


Heat Pipe Exchangers

Transcal®

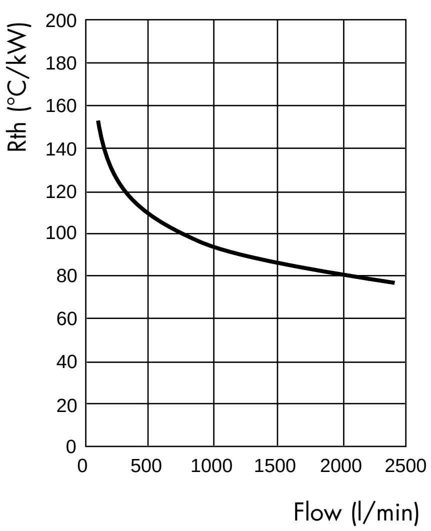
TRANSCAL® SC 55
FOR NATURAL CONVECTION
heq = 200 to 450 W / (m^2°C)

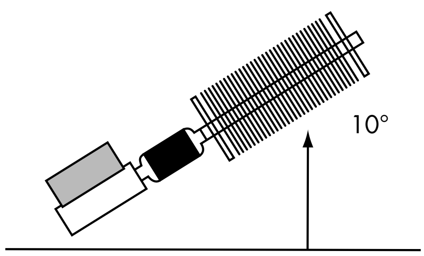




Catalog # / Ref. #	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	Weight Kg
TRANSCAL SC 55 J208342	573	200	110	150	24	124 or 93	57 (8 holes) or 48 (12 holes)	200	7

Thermal Resistance

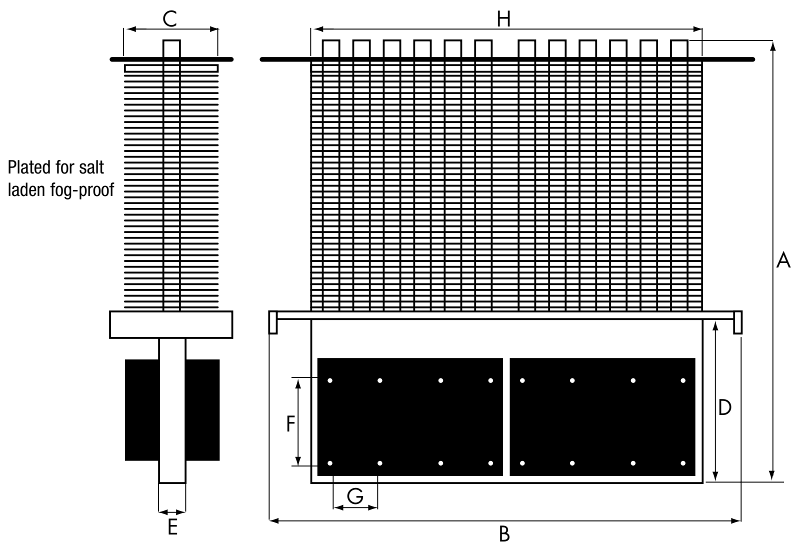


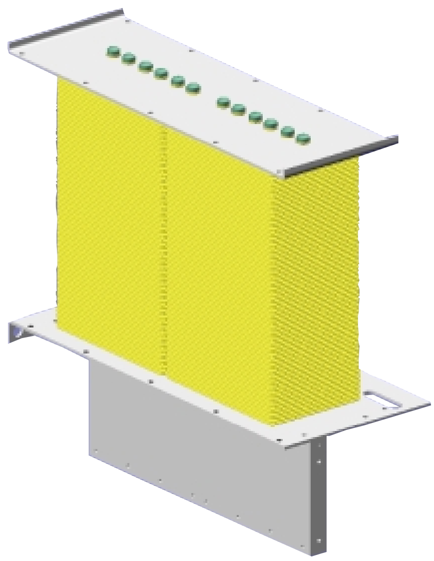


Heat Pipe Exchangers **Transcal®**

TRANSCAL® SC 57
FOR FORCED CONVECTION
h_{eq} = 300 to 900 W / (m²°C)

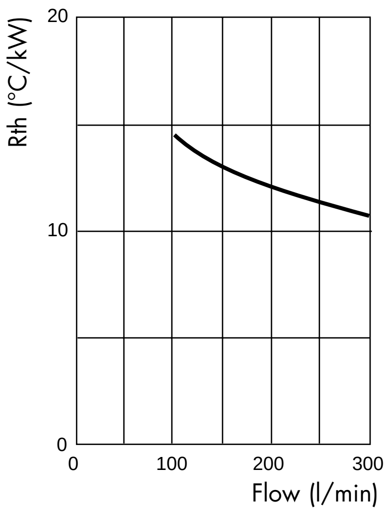
FOR SEMICONDUCTOR MODULES



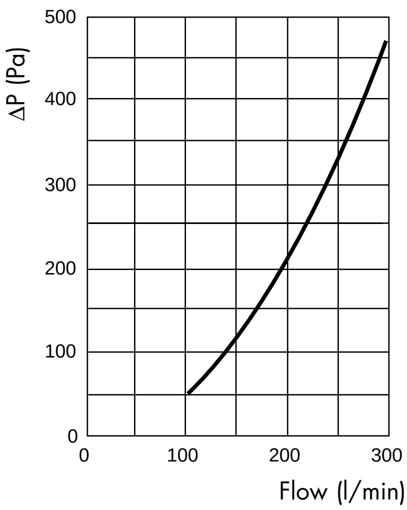


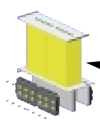
Catalog # / Ref. #	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	Weight Kg
TRANSCAL SC 57 C208842	500	405	103	161	24	124	57	7

Thermal Resistance Double Side



Pressure drop





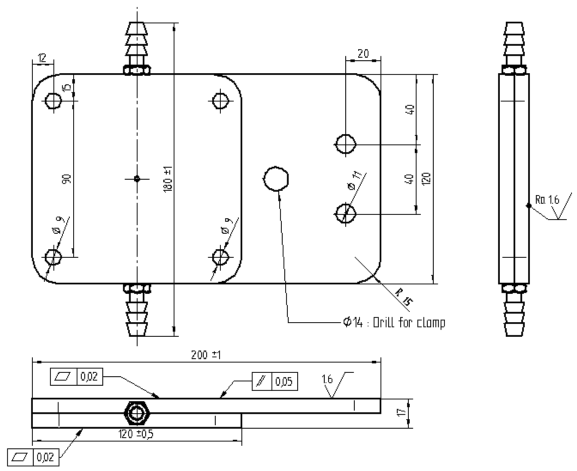
Rth for 6000 W dissipated power

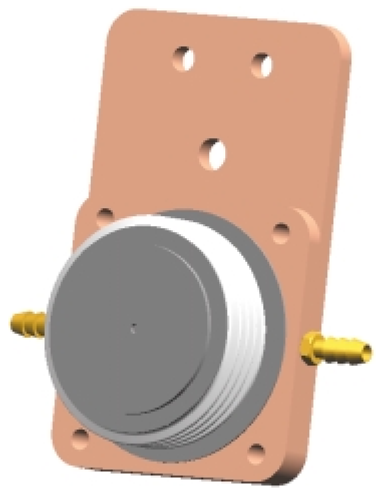
Water Cooling

Copper Calistor®

Copper CALISTOR® 100
h_{eq} up to 25000 W/m2.°C

FOR PRESS PACK COMPONENTS OF 80 TO 100 MM DIAMETER

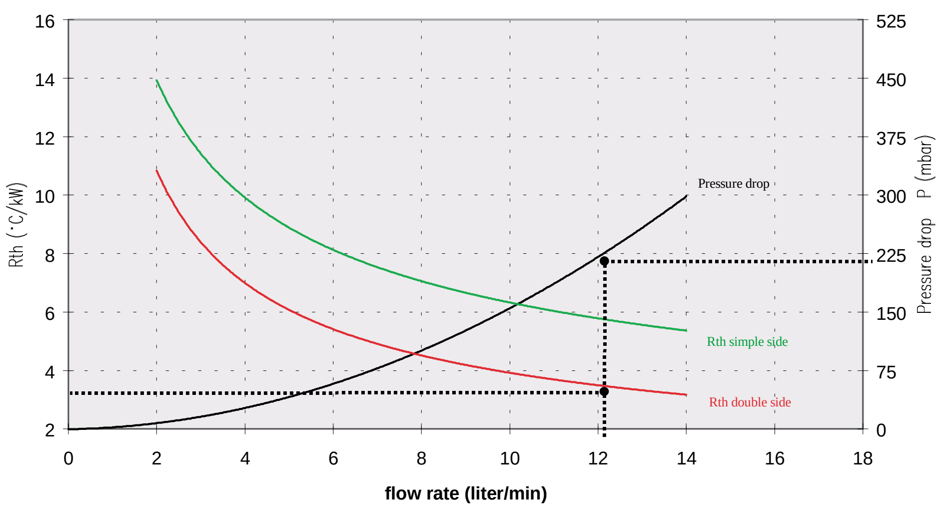




Calistor Copper is manufactured by combining two different technologies:
Hot forming allows the two halves of cooling device to be molded with precise reproduction of Calistor internal dimensions, and **controled atmosphere brazing** of different parts guarantees water tightness of nickel-plated assembly.

Mechanical Safe load: 50 kN for a specific supporting surface up to 100 mm; 100 kN for ∅ 120 mm
Transient Current : 40 kA RMS / 1 second, 120 kA RMS / 100 ms, 200 kA peak / 8.3-10 ms.
Different combinations of the following features create 4 different versions of Calistor:
. Screwed brass nozzles or brazed copper nozzles for reducing weight
. With or without electrical connection (personalized drill holes)

Hydraulic nozzles	Thickness Calistor (mm)	∅ Nozzle	Weight (kg)	Electrical connection	Ref. #
screwed	17	½"	2,8	yes	G223474
screwed	17	½"	2,1	No	H223475
brazed	13	½"	2,1	yes	J223476
brazed	13	½"	1,6	No	K223477

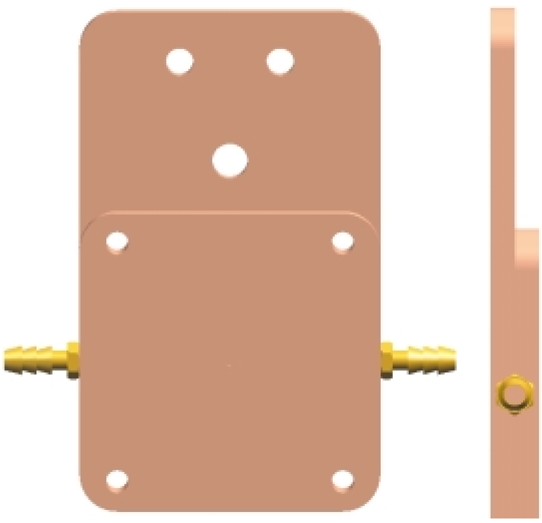


Water Cooling — Copper Calistor®

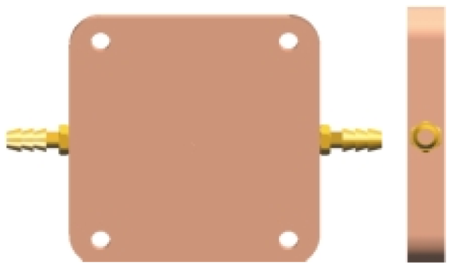
Options

- ✔ customized drill holes on Calistor and connecting lug
- ✔ For 17 mm version, specific screwed nozzles depending on application (straight or bent).

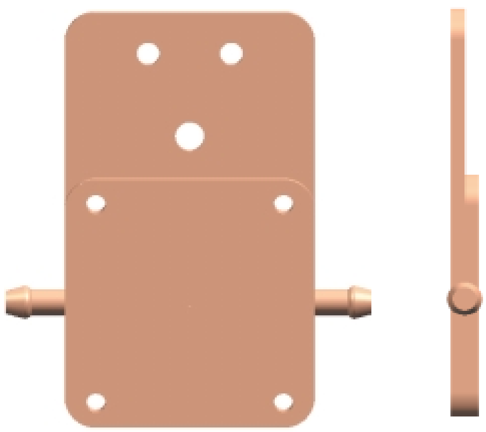
Different Calistor configurations



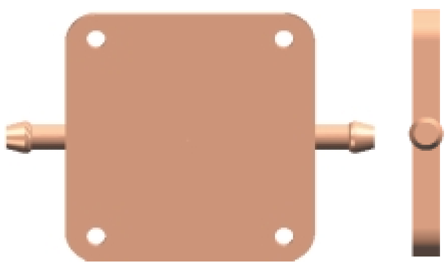
Ref. # G223474
fluted screwed nozzles
nickel-plated brass
with electrical connection
Continuous let-thru current =10 kA



Ref. # H223475
fluted screwed nozzles
nickel-plated brass
without electrical connection
Continuous let-thru current =15 kA



Ref. # J223476
Slimmer Calistor
Copper-brazed nozzles with
electrical connection
Continuous let-thru current =7,5 kA



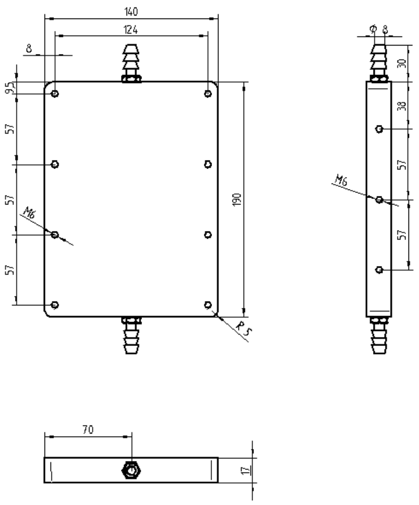
Ref. # K223477
Slimmer Calistor
Copper-brazed nozzles
without electrical connection
Continuous let-thru current =15 kA

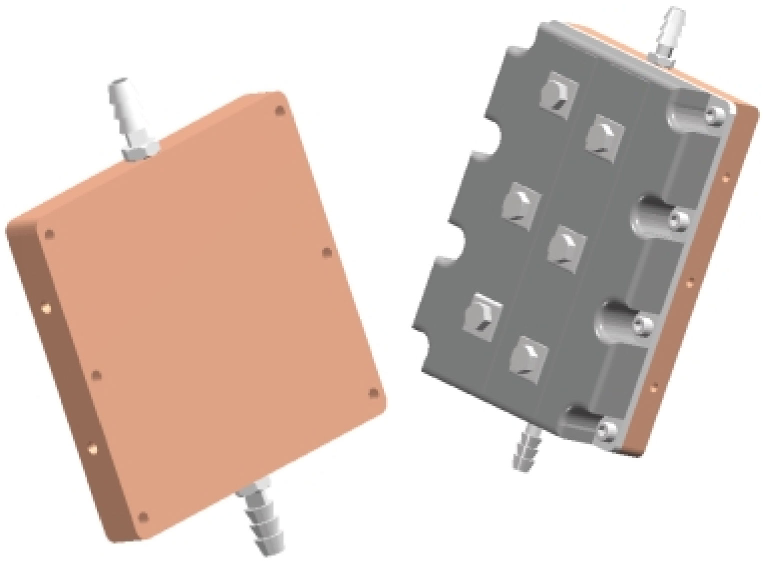
Water Cooling — Copper Moducal®

COPPER MODUCAL®

h_{eq} up to13000 W/m2.°C

FOR IGBT MODULES

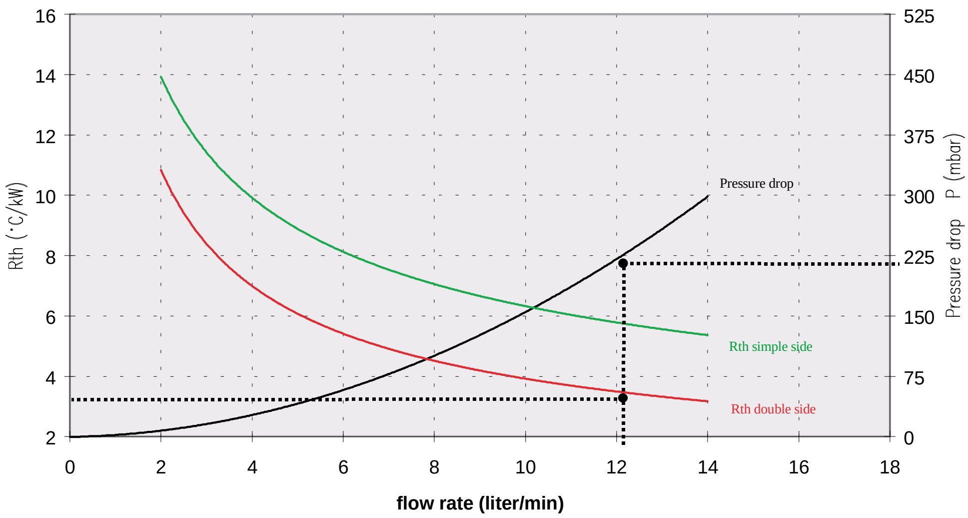




Copper Moducal is manufactured by combining two different technologies:
Hot forming allows the two halves of cooling device to be molded with precise reproduction of Calistor internal dimensions, and **controled atmosphere brazing** of different parts guarantees water tightness of nickel-plated assembly.

Moducal is available in two versions: with fluted nozzles, directly screwed on the Moducal, as shown in the above drawing, along with a thinner and consequently lighter version with brazed teat nozzles.
Moducal is also available without red-drilled holes.

Catalog number	Size L x l (mmxmm)	Thickness Calistor (mm)	Weight (kg)	∅ Nozzle	Ref. #
Moducal 14-19	140 x 190	17	4	½"	N223710
	140 x 190	13	3	½"	N223730
Moducal 14-13	140 x 130	17	2.5	½"	On Request
	140 x 130	13	2	½"	

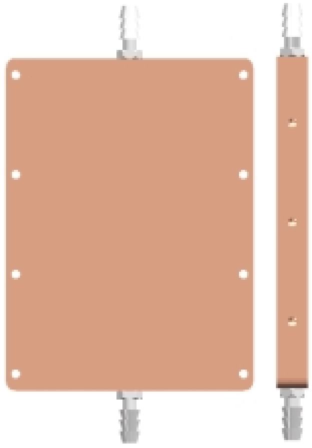


Water Cooling — Copper Moducal®

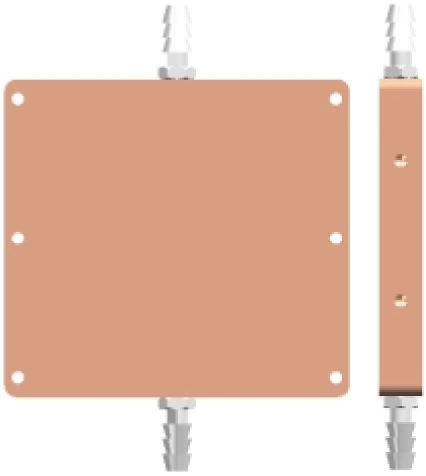
Options

- ✔ Electrochemical nickel plating
- ✔ For version 17mm, specific screwed nozzles according to the application (straight or bent)

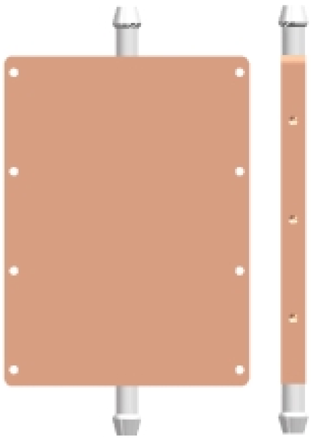
Different Moducal Configurations



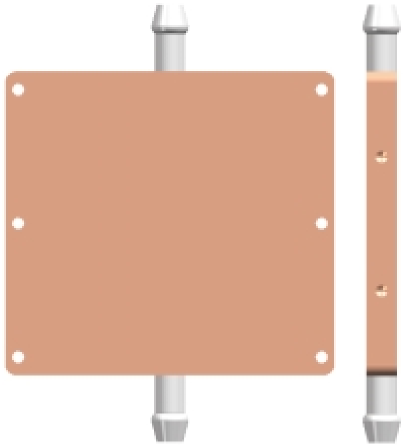
Ref. # N223710 :
fluted screwed nozzles
Moducal 140x190



Ref. # On request :
fluted screwed nozzles
Moducal 140x130



Ref. # N223730
Slimmer Moducal with copper brazed nozzles
140x190



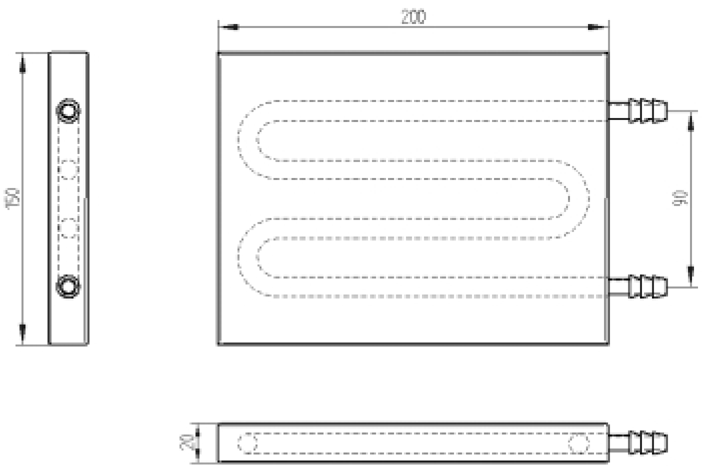
Ref. # On request
Slimmer Moducal with copper brazed nozzles
140x130

Water Cooling

Calitube®

Water-cooled cold plate
h_{eq} up to 2000 W/m2.°C

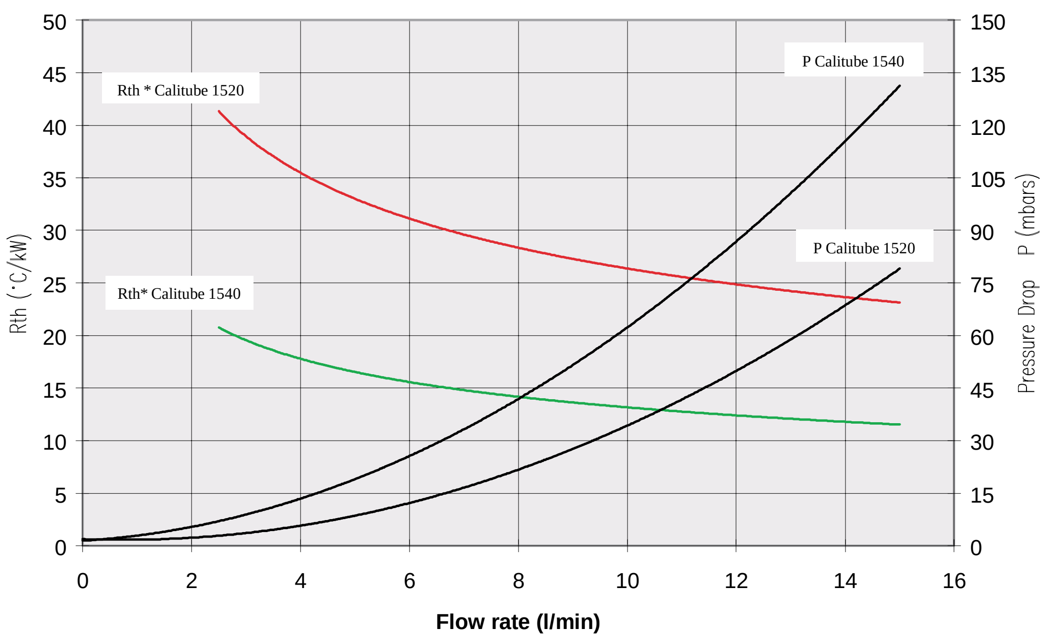
FOR ELECTRONIC COMPONENTS MAINLY IGBTS





Calitube is manufactured by overmolding a stainless steel pipe inside an aluminum block; assembly is thus machined to have appropriate roughness and flatness for mounting surface drilled in order to fit the components to be cooled.

Catalog number	Size Lxl (mmxmm)	Tickness (mm)	Weight (kg)	Ref. # (Calitube without holes)
Calitube 1520	150 x 200	20	1.7	D223770
Calitube 1540	150 x 400	20	3.4	E223771



Custom features

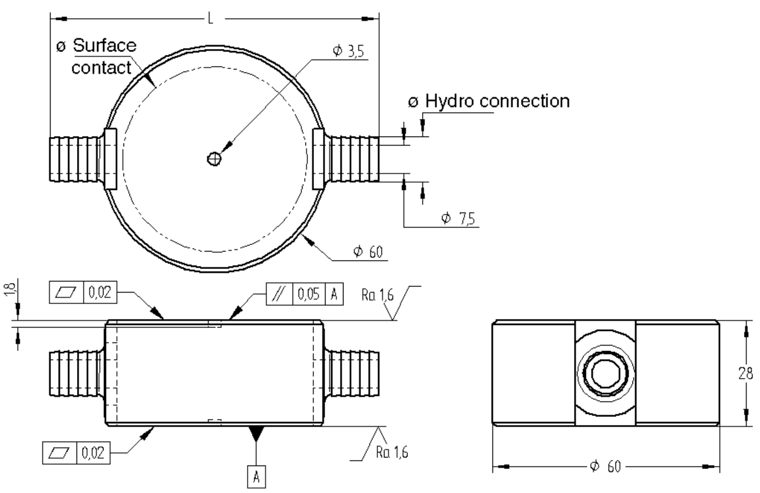
- ✔ Customized drill holes
- ✔ Specific stainless steel nozzles
- ✔ Special dimensions

*Above curves relate to thermal resistance achieved with single-sided Calitube; this cooling device can be fitted with components on both sides. Data available on request.

Water Cooling — Aluminum Calistor® 50-60

h_{eq} up to 20 000 W/(m²°C)

For Press-Pack power electronics components



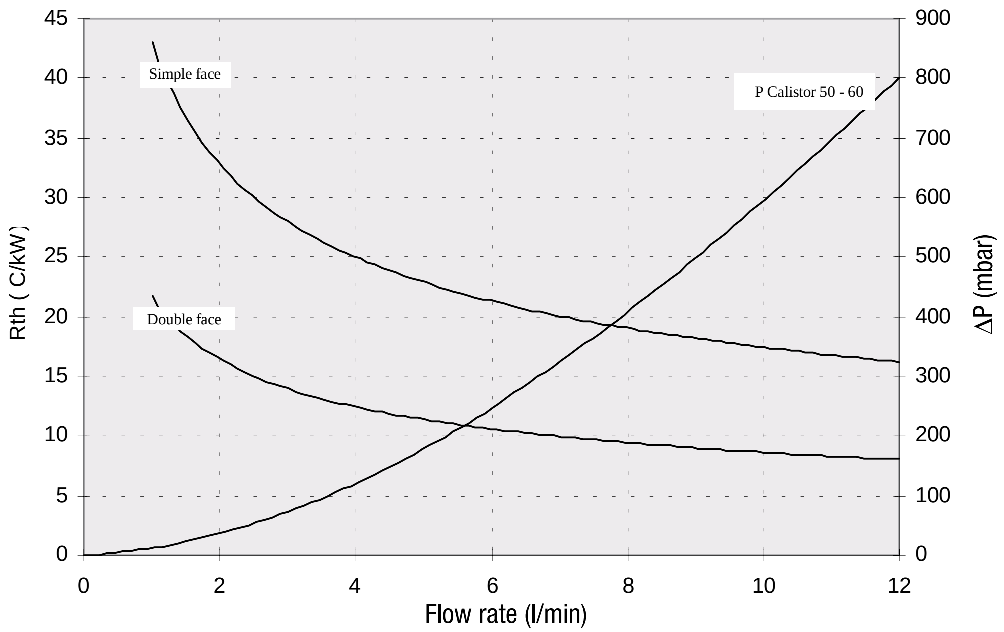


Patented design based on mastering of aluminum vacuum brazing via stacking of pre-cut colaminated grids.

Compression withstand: 45 kN with a ∅ 49 mm minimum supporting surface and 70 kN with ∅ 59 mm at 30°C.

Maximum operating inner pressure: 10 bars
RMS current through CALISTOR: up to continuous 7 kA, 40 kA for 1 s, 120 kA for 100 ms.
Peak current through CALISTOR: 200 kA = 10 ms.

Thermal and Pressure Characteristics:



Water Cooling Aluminum Calistor® 50-60

Calistor reference numbers with standard hydro-connections

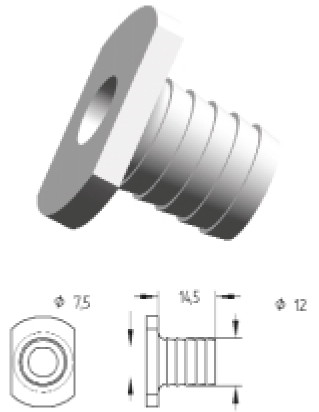
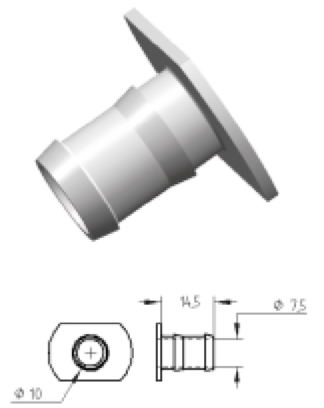
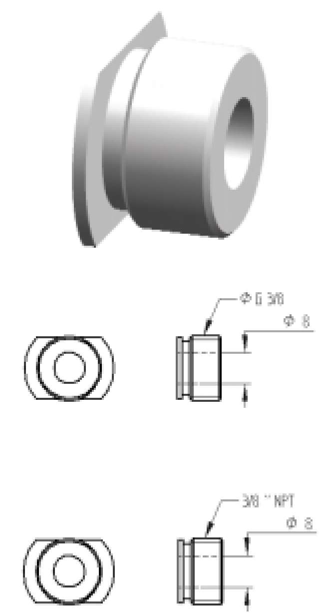
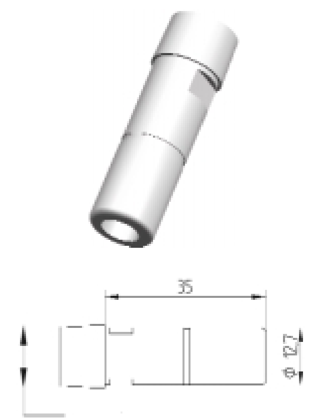
Contact surface (mm)	Hydro-connection	L (mm)	Weight (kg)	Ref. #
∅ 59	Fluted aluminum Ø 12	87	0,25	X 223 649
∅ 49	Fluted aluminum Ø 12	87	0,25	W 223 648
∅ 59	Fluted Titanium Ø 10	87	0,25	Y 223 650
∅ 49	Fluted Titanium Ø 10	87	0,25	M 209 587
∅ 59	Titanium Ø Gaz 3/8” (1)	78	0,25	Z 223 651
∅ 49	Titanium Ø Gaz 3/8” (1)	78	0,25	Z 209 575
∅ 59	Titanium Ø NPT 3/8” (1)	78	0,25	H 223 452
∅ 49	Titanium Ø NPT 3/8” (1)	78	0,25	A 223 652
∅ 59	Smooth stainless steel Ø 12.7	156	0,25	Q 223 758
∅ 49	Smooth stainless steel Ø 12.7	156	0,25	P 223 757

(1) : “Gas” thread without tightness, class-A variation complying with NFE 03-005 standard.
“NPT” thread without tightness, class-A variation complying with NFE 03-005 standard.

Options on request

- ✔ Surface plating
- ✔ Electrical connection

Dimensions of standard hydro-connections

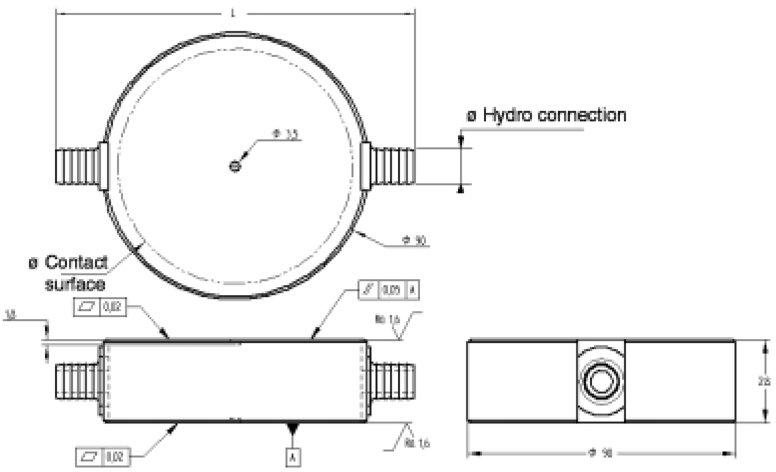
Fluted aluminum nozzle	Fluted titanium nozzle	Titanium nozzle ∅ gaz 3/8” and ∅ NPT 3/8”	Smooth stainless steel nozzle
			

Other hydro-connections on request (bent connections).

Water Cooling — Aluminum Calistor® 80-90

h_{eq} up to 20 000 W/(m²°C)

For Press-Pack power electronics components



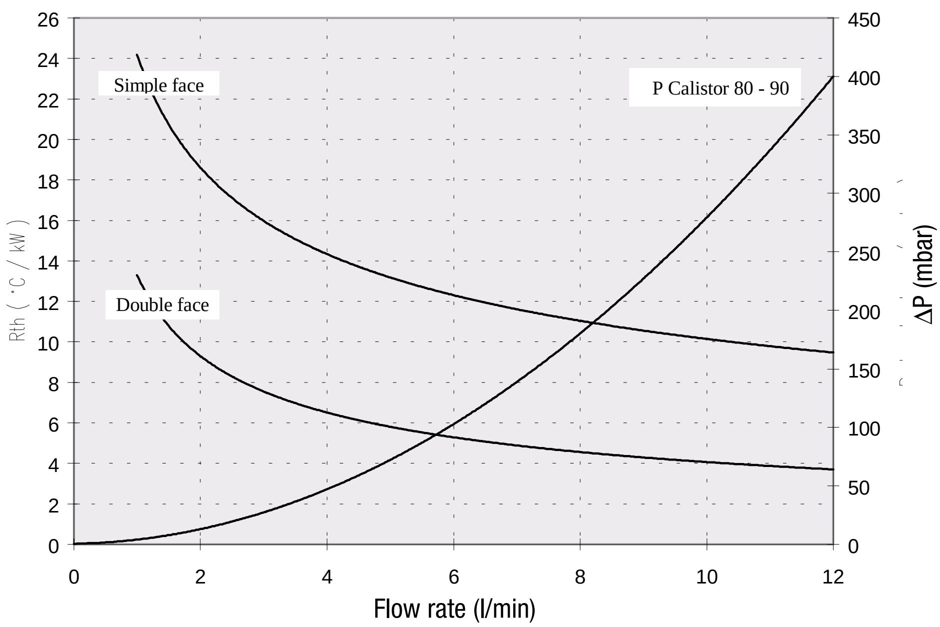


Patented design based on mastering of aluminum vacuum brazing via stacking of pre-cut colaminated grids.

Compression withstand: 90 kN with a ∅ 79 mm minimum supporting surface and 110 kN with ∅ 89 mm at 30°C.

Maximum operating inner pressure: 10 bars
RMS correct through CALISTOR: up to continuous 15 kA, 40 kA for 1 s, 120 kA for 100 ms.
Peak current through CALISTOR: 200 kA = 10 ms.

Thermal and Pressure Characteristics:



Water Cooling — Aluminum Calistor® 80-90

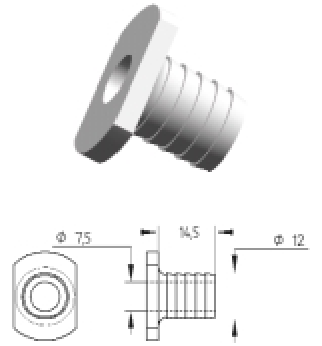
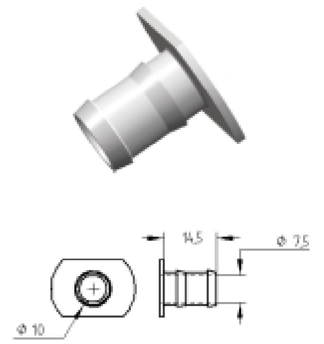
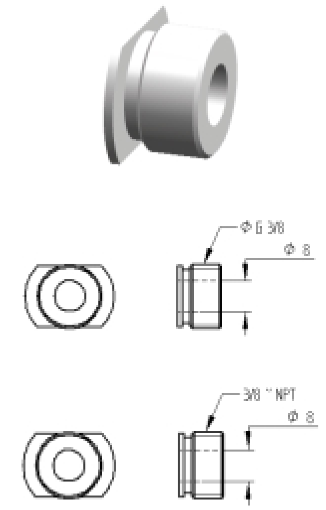
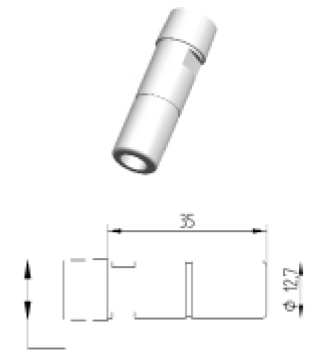
Calistor reference numbers with standard hydro-connections

Contact surface (mm)	Hydro-connection	L (mm)	Weight (kg)	Ref. #
∅ 89	Fluted aluminum Ø 12	121	0,35	B 223 653
∅ 79	Fluted aluminum Ø 12	121	0,35	J 208 549
∅ 89	Fluted Titanium Ø 10	117	0,35	C 223 654
∅ 79	Fluted Titanium Ø 10	117	0,35	N 208 553
∅ 89	Titanium Ø Gaz 3/8” (1)	108	0,35	D 223 655
∅ 79	Titanium Ø Gaz 3/8” (1)	108	0,35	A 209 576
∅ 89	Titanium Ø NPT 3/8” (1)	108	0,35	E 223 656
∅ 79	Titanium Ø NPT 3/8” (1)	108	0,35	F 223 657
∅ 89	Smooth stainless steel Ø 12.7	186	0,35	S 223 760
∅ 79	Smooth stainless steel Ø 12.7	186	0,35	R 223 759

(1) : “Gas” thread without tightness, class-A variation complying with NFE 03-005 standard.
“NPT” thread without tightness, class-A variation complying with NFE 03-005 standard.

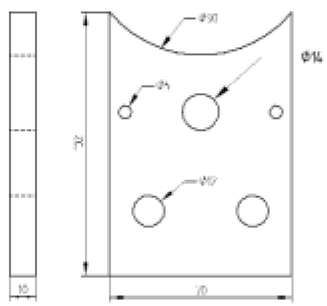
Options on request

- ✔ Surface plating
- ✔ Electrical connection

Fluted aluminum nozzle	Fluted titanium nozzle	Titanium nozzle ∅ gaz 3/8” and ∅ NPT 3/8”	Smooth stainless steel nozzle
			

Other hydro-connections on request (bent connections).

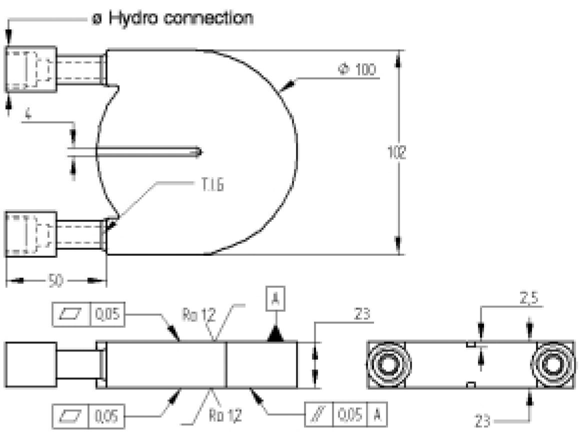
Electrical connection:
(Specific ref. - Ask us for details)

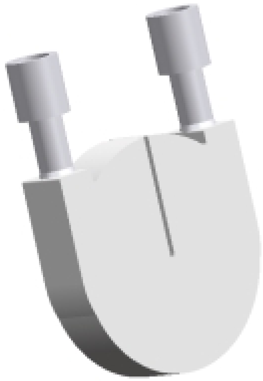


Water Cooling — Aluminum Calistor® 100

h_{eq} up to 15 000 W/(m²°C)

For Press-Pack power electronics components





Calistor
straight connections



Calistor
bent connections

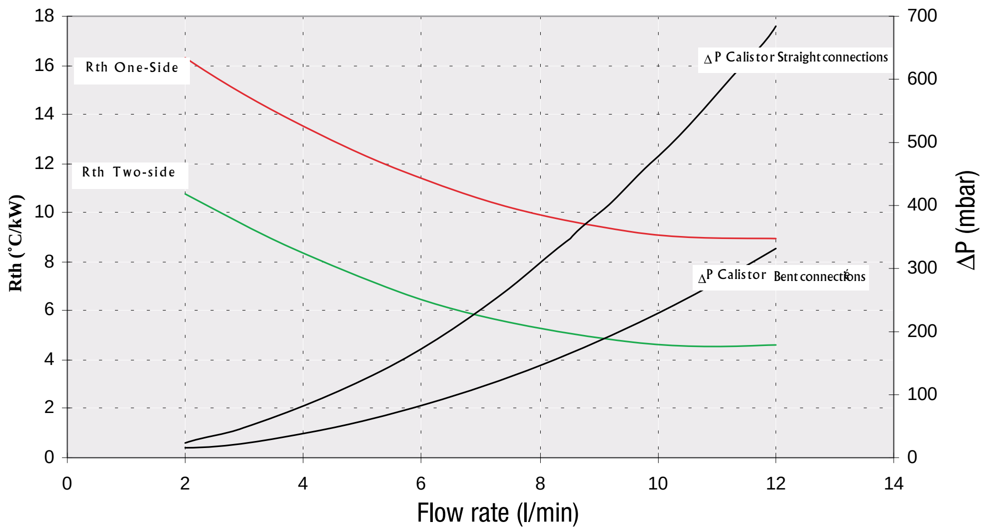
Patented design based on mastering of aluminum vacuum brazing via stacking of pre-cut colaminated grids.

Two Calistors: Straight or bent connections, see drawings.

Compression withstand: 100 kN for a supporting surface of Ø 99 mm at 30°C.

Maximum operating inner pressure: 10 bars
RMS current through CALISTOR: up to continuous 18 kA, 40 kA for 1 s, 120 kA for 100 ms.
Peak current through CALISTOR: 200 kA = 10 ms.

Thermal and Pressure Characteristics:



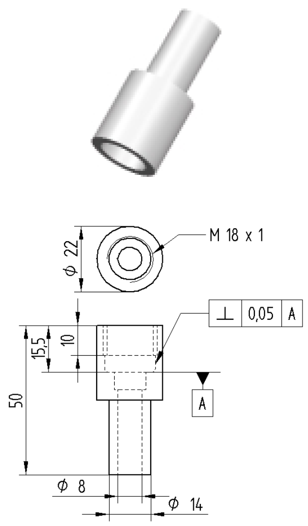
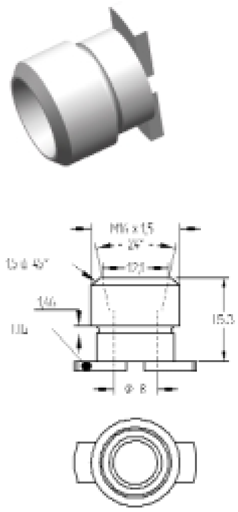
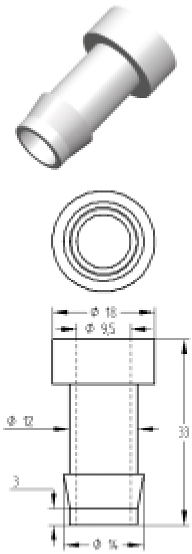
Water Cooling — Aluminum Calistor® 100

Calistor reference numbers with standard hydro-connections

Contact surface (mm)	Hydro outlet	Hydro-connection	Weight (kg)	Ref. #
∅ 84	Straight	Aluminium M 18	0,5	C223792
∅ 84	Straight	Aluminium M 16	0,5	D223793
∅ 84	Straight	Fluted aluminum	0,5	E223794
∅ 84	Bent	Aluminium M 18	0,58	F223795
∅ 84	Bent	Aluminium M 16	0,58	G223796
∅ 84	Bent	Fluted aluminum	0,58	H223797
∅ 99	Straight	Aluminium M 18	0,5	N210485
∅ 99	Straight	Aluminium M 16	0,5	J223798
∅ 99	Straight	Fluted aluminum	0,5	K223799
∅ 99	Bent	Aluminium M 18	0,58	L223800
∅ 99	Bent	Aluminium M 16	0,58	M223801
∅ 99	Bent	Fluted aluminum	0,58	N223802

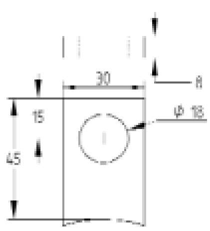
Options on request

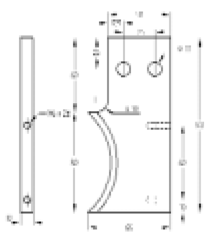
- ✔ Surface plating
- ✔ Electrical connection

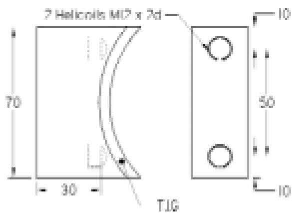
Aluminum Nozzle M 18	Aluminum Nozzle M 16	Fluted Aluminum Nozzle
		

Other hydro-connections on request (bent connections)

Electrical connection:
(Specific ref. - Ask us for details)







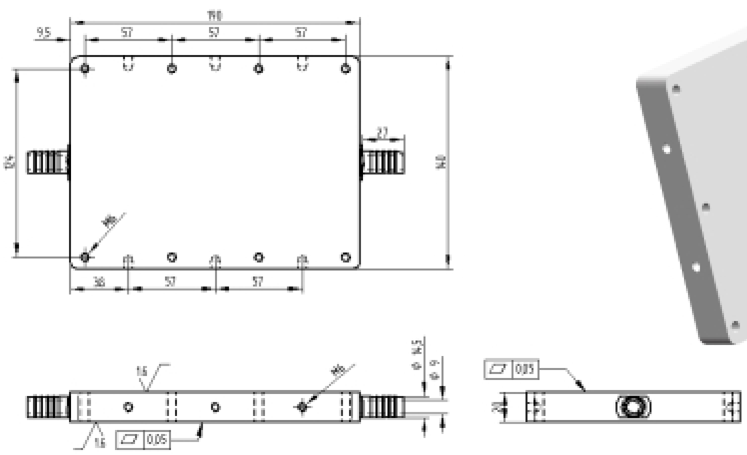
RMS continuous current in connections: up to 2500 A | 4500 A | 10 kA

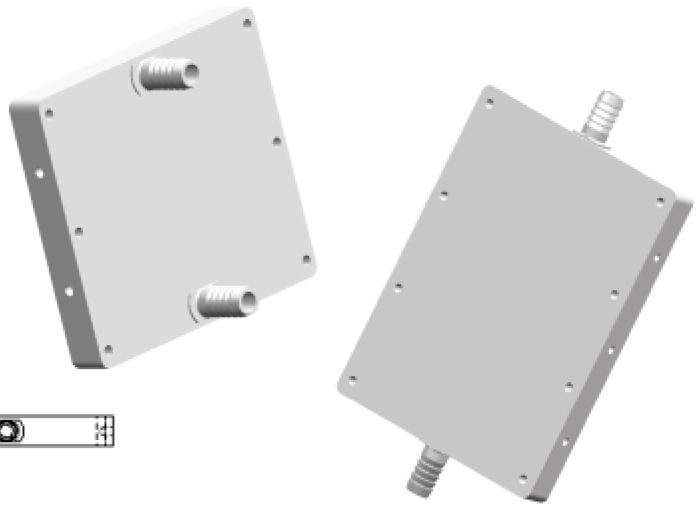
Water Cooling

Aluminum Moducal®

h_{eq} up to 16000 W/m2.°C

For power electronic components

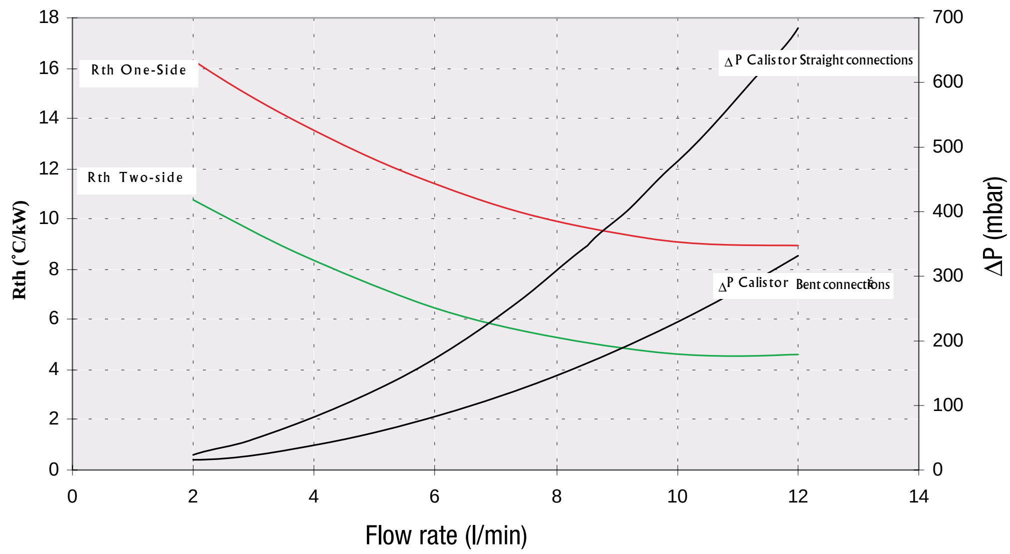




Patented design based on mastering of aluminum vacuum brazing via stacking of pre-cut colaminated grids.

2 Types of Moducal
- 140 mm x 190 mm Moducal
- 140 mm x 130 mm Moducal

2 different connection types, straight or perpendicular.
- Fluted Titanium nozzles
- 3/8" gaz threaded Titanium nozzles



Ferraz Shawmut

Water Cooling — Aluminum Moducal®

Moducal references with standards hydro-connections

Moducal	Thickness	Weight (kg)	Hydro outlet	Hydro-connection Fluted or threaded	Ref. Num.
140 x 190	15,5	0,7	D	3/8" gaz threaded	R223667
140 x 190	15,5	0,7	P	3/8" gaz threaded	W223671
140 x 190	20	1,05	D	3/8" gaz threaded	S223668
140 x 190	15,5	0,7	D	Fluted	T223669
140 x 190	15,5	0,7	P	Fluted	Y223673
140 x 190	20	1,05	D	Fluted	B209108
140 x 130	15,5	0,5	D	3/8" gaz threaded	L223777
140 x 130	15,5	0,5	P	3/8" gaz threaded	N223664
140 x 130	20	0,75	D	3/8" gaz threaded	L223662
140 x 130	15,5	0,5	D	Fluted	J223660
140 x 130	15,5	0,5	P	Fluted	Q223666
140 x 130	20	0,75	D	Fluted	D208843

Options on request

- ✔ 8 µm nickel-plating
- ✔ other nozzles on request

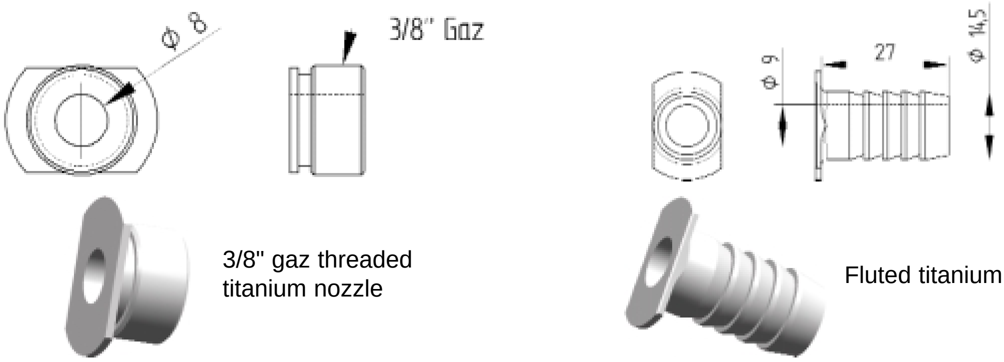
Hydro-connections

P outlet: perpendicular

D outlet: straight



Hydro-connection dimensions



3/8" gaz threaded titanium nozzle

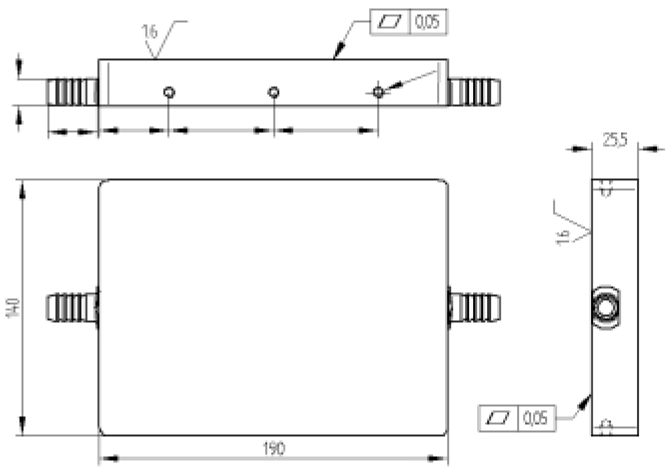
Fluted titanium nozzle

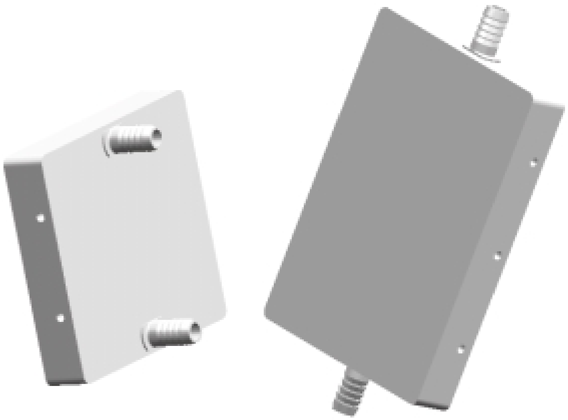
("Gas" thread without tightness, Class-A variation complying with NF E03-05 Standard)

Water Cooling — Aluminum Moducal Thick®

heq up to 7500 W/m2.°C

For power electronic components (IGBT, diodes, etc.)



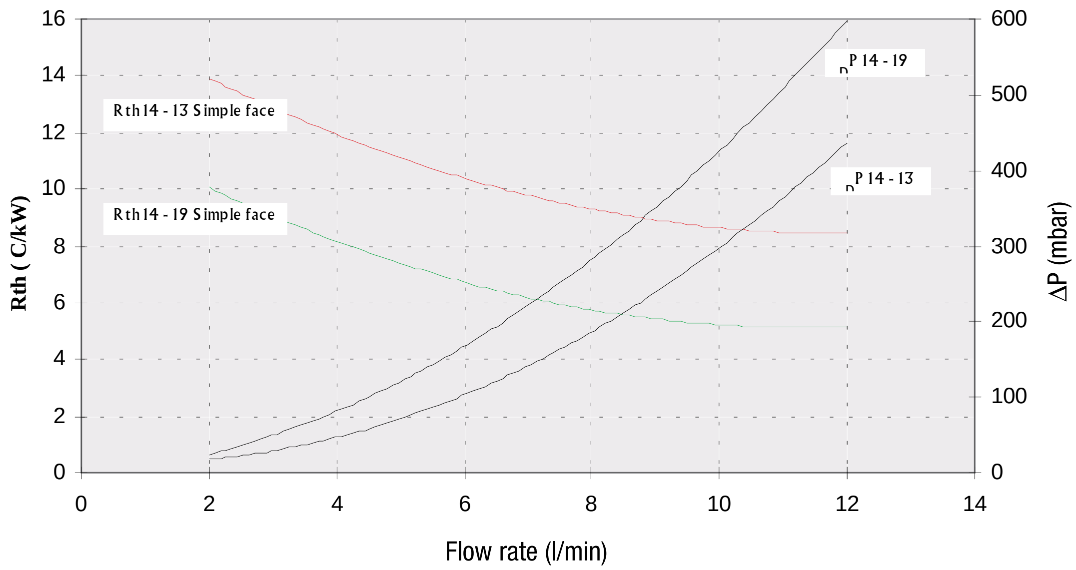


Custom drillings

Patented design based on mastering of aluminum vacuum brazing via stacking of pre-cut colaminated grids.

2 types of overthick Moducal:
- 140 mm x 190 mm Moducal
- 140 mm x 130 mm Moducal

2 types of hydro-connection, straight or perpendicular:
- Fluted Titanium nozzles
- 3/8" gas threaded Titanium nozzles



Ferraz Shawmut

Water Cooling — Aluminum Modocal Thick®

Oversize thickness Moducal references with standard hydro-connections

Moducal	Thickness	Weight (kg)	Hydro outlet	Hydro-connection Fluted or threaded	Ref. Num.
140 x 190	25,5	1,45	D	3/8” gaz threaded	V223670
140 x 190	25,5	1,45	P	3/8” gaz threaded	Y223788
140 x 190	25,5	1,45	D	Fluted	X223672
140 x 190	25,5	1,45	P	Fluted	Z223789
140 x 130	25,5	1,25	D	3/8” gaz threaded	M223663
140 x 130	25,5	1,25	P	3/8” gaz threaded	A223790
140 x 130	25,5	1,25	D	Fluted	P223665
140 x 130	25,5	1,25	P	Fluted	B223791

Options on request

- ✔ 8 µm nickel-plating
- ✔ other nozzles on request

Hydro-connections

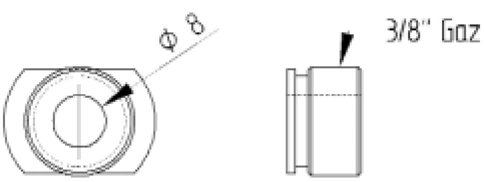
P outlet: perpendicular

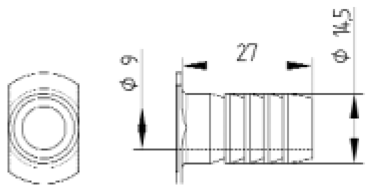


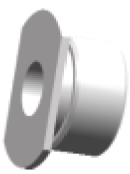
D outlet: straight



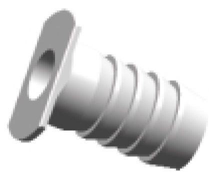
Hydro-connection dimensions







3/8" gaz threaded titanium nozzle

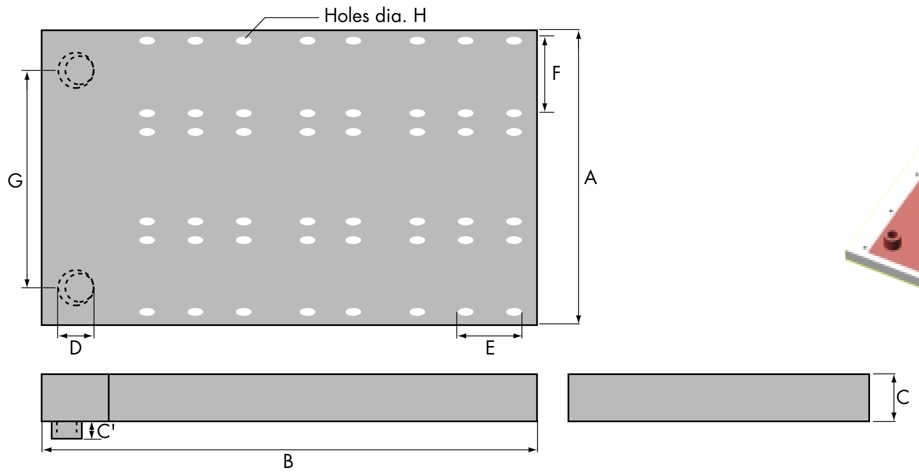


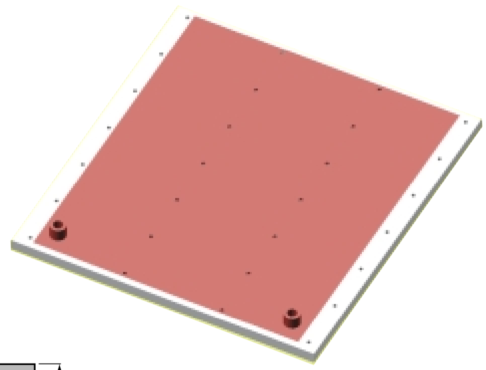
Fluted titanium nozzle

("Gas" thread without tightness, Class-A variation complying with NF E03-05 Standard)

Water Cooling — Multical® 1540/3040/4540

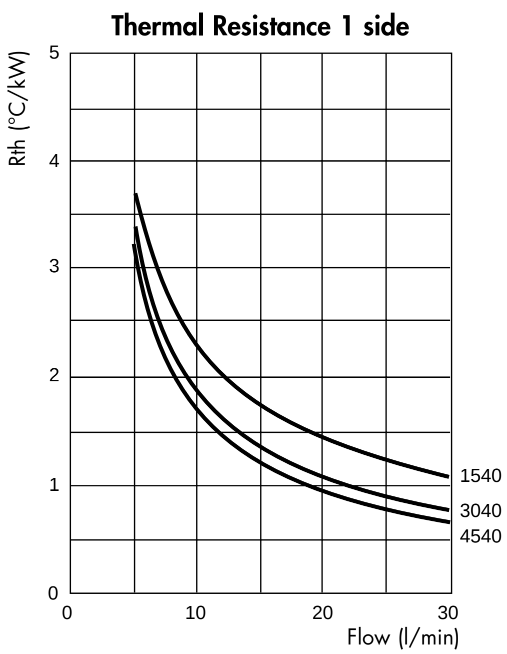
MULTICAL® 1540/3040/4540
h_{eq} = 5000 to 10000 W /(m²°C)

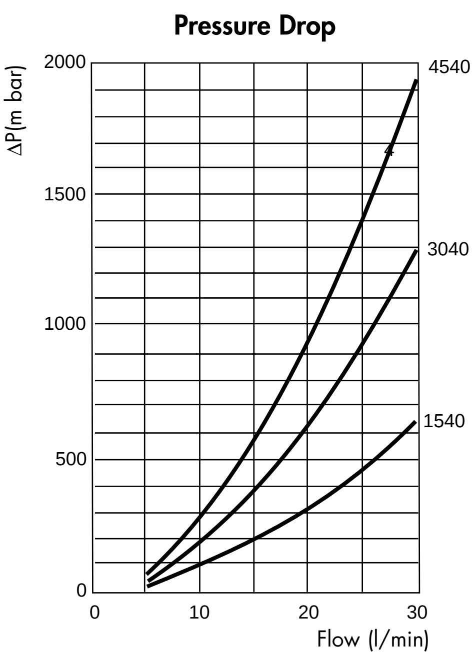




Catalog number	A (mm)	B (mm)	C (mm)	C' (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	Weight Kg
MULTICAL 1540	200	450	20	10	30	57	124	150	M6	5
MULTICAL 3040	350	450	20	10	30	57	124	300	M6	8.5
MULTICAL 4540	500	450	20	10	30	57	124	450	M6	12.5

Ref. number on request

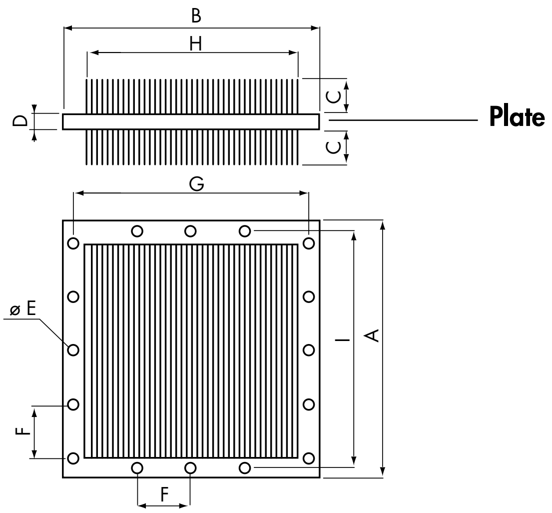




Calex® Air

Calex® Forced Convection

For enclosures



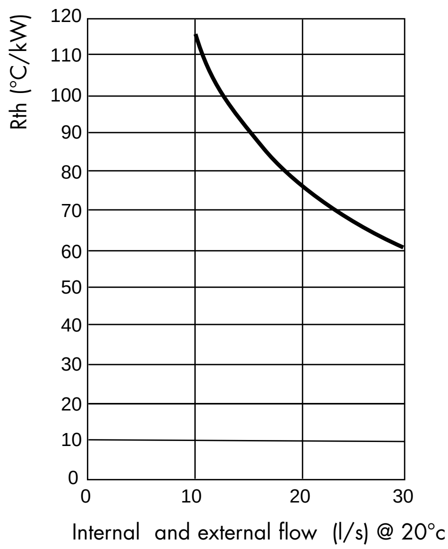


Catalog number	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	Weight Kg
CALEX-Air	240	200	70	8	M5	50	185	160	230	3.8

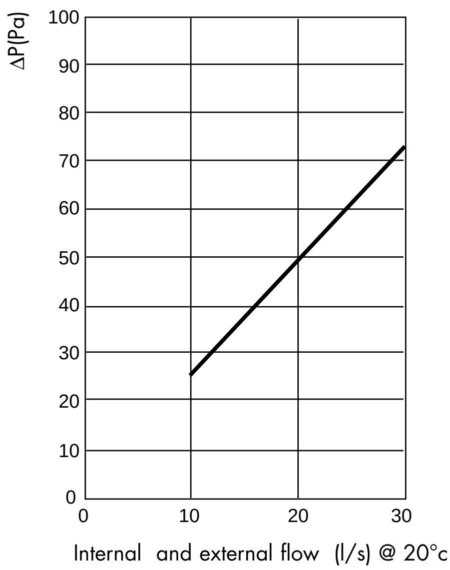
Ref. number on request

This aluminum air-to-air exchanger is designed to cool electronic casing by internal and external forced convection

Thermal Resistance

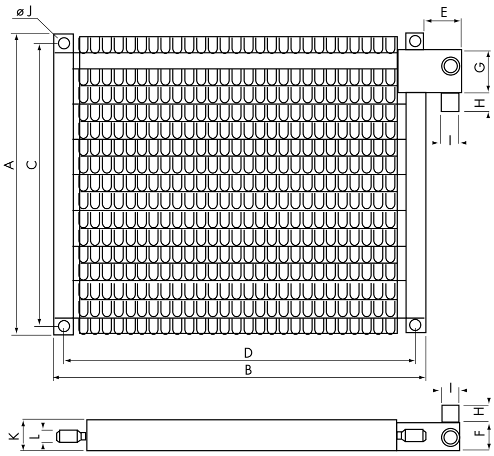


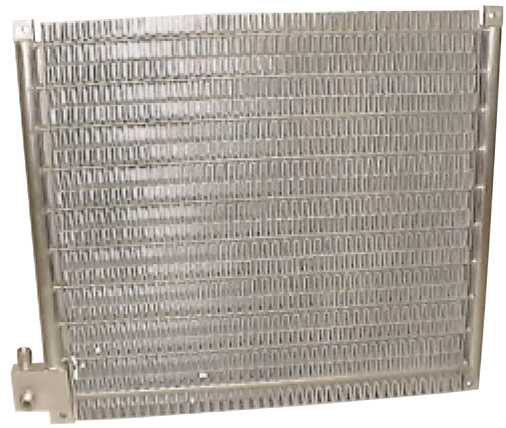
Pressure Drop



Calex® Water

Calex® Natural Convection





Catalog number	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm	Weight Kg
CALEX-Water	410	450	290	430	35	20	50	15	M16 x 1.5	7	25	8	3.6

Ref. number on request

Thermal resistance 37.5°C/kW at a water flow rate of 2 l/min.
Dissipated power 400 W, air-to-water temperature gap 15°C.

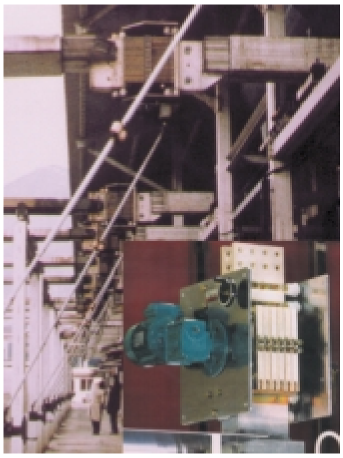
Water pressure drop lower than 50 mbar at 2 l/min

This air-to-water exchanger cools electronic equipment mounted in a frame. It is fixed between two racks and removes by natural convection the power dissipated at each level. It meets severe environmental requirements thanks to its stainless-steel pipes for liquid and nickel-plated aluminum exchange surface to air.

High Current Disconnectors

HIGH-CURRENT DISCONNECTORS
NORD Range
1500 V DC - 14 kA to 140 kA
Single pole / Double pole / Change-over
Aluminum or Copper Terminals

- ACCEPT BUSBAR DILATIONS THANKS TO BUILT-IN DEFORMABILITY (FLEXIBLE JOINTS ARE NOT NECESSARY)
- LOW AND CONSTANT VOLTAGE DROP
- SELF-CLEANING EFFECT ON CONTACT
- HIGH SHORT-CIRCUIT CURRENT WITHSTAND
- LARGE INSULATION AND CREEPAGE DISTANCES
- EASY CONNECTIONS TO:
  - ALUMINUM BUSBARS BY WELDING
  - COPPER BUSBARS BY BOLTING
- LARGE CUSTOMIZATION POSSIBLE WITH :
  - ACTUATORS (MOTOR, PNEUMATIC, MANUAL)
  - AUXILIARIES (LIMIT SWITCHES, LOCKS, CONTROL BOXES)
  - DIMENSIONS TO FIT



MAIN TECHNICAL CHARACTERISTICS

Electrical Data

- Temperature rise at nominal current (with 40°C max. ambient temperature) less than : 65°C
- Typical temperature rise at nominal current (with 40°C max. ambient temperature) : 15°C above busbars
- Typical voltage drop at nominal current : 40 mV
- Peak short-circuit current withstand (upon circuit configuration) : 10 x (Nominal current)
- Dielectric withstand strength
  - * Between live parts in open position : 10 kV - 50 Hz - 1 min
  - * Between live parts and earth : 10 kV - 50 Hz - 1 min
  - * Between auxiliary contacts and earth : 2 kV - 50 Hz - 1 min
  - * Between motor (AC) and earth : 2,5 kV - 50 Hz - 1 min
- SCR leakage current breaking capacity (upon request) : 1 A - 100 V DC L/R = 5 ms
- Power breaking capacity up to 100 kA - 100 V DC - L/R < 20 msec : Upon request

Mechanical Data

- Built-in standard deformability (longitudinally (dL) / transversally (dT) / axially (dA)) (higher values available upon request) : 25 / 80 / 10 mm
- Mechanical endurance (with respect to maintenance instructions). Higher endurance upon request : 20 000 Cycles
- Typical duration of opening or closing operation
  - * With motor operation : 3 to 12 seconds
  - * With pneumatic operation : Less than 1 second
- Ponctual contact temperature on live parts withstand without equipment damages : 140° C

TECHNOLOGY

- Visible break by direct seeing of the mobile silver-plated copper contacts
- Mechanically independant mobile contact arms with high-pressure springs
- Electrical contact with silver-to-silver contact
- Insulation with fiberglass reinforced polyester insulators
- Operation mechanism of bichromate galvanized steel by a toggle-closed system
- Disconnectors are self-supporting - Busbar support must be sized to withstand the disconnector additional weight
- Upon request, choice of input and output terminals in aluminum or silver-plated copper
- Upon request, two poles or change-over design by side association of two disconnectors

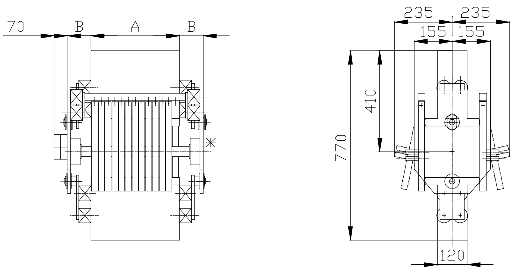
High Current Disconnectors

MAIN DIMENSIONS

Nominal current (kA)	14	18	22	27	32	35	39	43	47	51	55	58	62	66	70
No. mobile contacts	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68
A (mm)	200	255	310	365	420	475	530	585	640	695	750	805	860	915	970
B (mm) pour dL 25	90	90	90	90	90	90	90	90	90	97	97	97	97	97	97
Weight (kg)	130	150	175	200	225	250	280	305	330	355	380	410	435	460	485

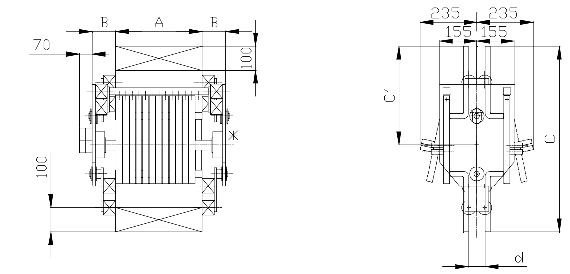
In	C	C'	D	E	E'
> 47 kA	892,5	460	842,5	820	460
47 kA	802,5	432,5	780	792,5	432,5

Aluminium type



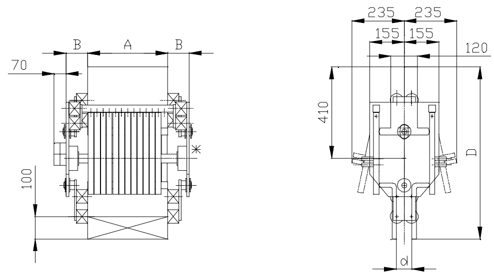
* Control device ⊞ Auxiliary contact

Copper type



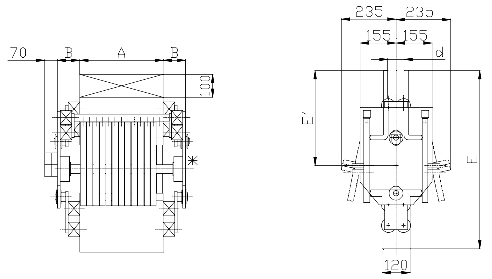
* Control device ⊞ Auxiliary contact ⊠ Bolting scheme below

Aluminium / Copper type



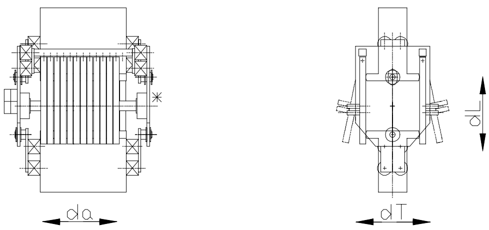
* Control device ⊞ Auxiliary contact ⊠ Bolting scheme below

Copper / Aluminium type

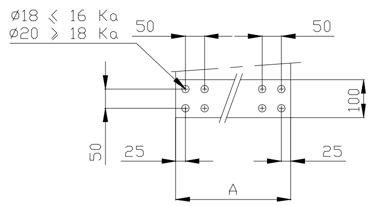


* Control device ⊞ Auxiliary contact ⊠ Bolting scheme below

Deformability
(Factory settings at : dL: 12,5 - dT: 40 - dA: 5)



Typical bolting scheme on copper connecting plates
d, chosen from 0 to 60 mm



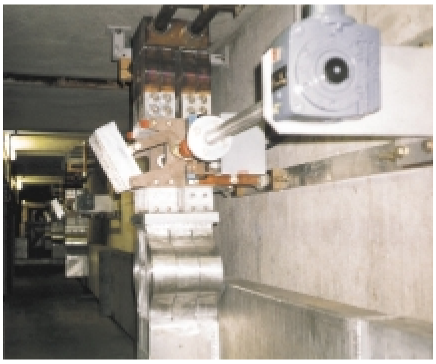
With its engineering capabilities in Mannheim (Germany) and Saint-Loup-de-Naud (France), and its testing platforms in Saint-Bonnet-de-Mure (France) and Newburyport (USA), Ferraz Shawmut offers customized solutions to meet your most specific requirements:

- Adapted drives or control units
- Enclosures for switch protection
- Technical performance specifications (short-circuit current capability, endurance, grounding contacts)

High Current Disconnectors

HIGH-CURRENT DISCONNECTORS
MBD (Multi-Blade Disconnectors) Range
2000 V DC - 5000 to 60000 A
Single-pole / Double-pole / Change-over
Aluminum or Copper Terminals

- LOW AND CONSTANT VOLTAGE DROP
- LARGE INSULATION AND CREEPAGE DISTANCES
- EASY CONNECTIONS BY BOLTING TO
  - ALUMINUM OR COPPER BUSBARS
- LARGE CUSTOMIZATION POTENTIAL WITH:
  - ACTUATORS (MOTOR, PNEUMATIC, MANUAL)
  - AUXILIARIES (LIMIT SWITCHES, LOCKS, CONTROL BOXES)
  - DIMENSIONS TO FIT (ADAPTATION TO CONNECTING TERMINALS)



MAIN TECHNICAL CHARACTERISTICS

Electrical Data

•Temperature rise at nominal current (with 40°C max. ambient temperature) less than	: 65°C
•Voltage drop at nominal current less than	: 50 mV
•Peak short-circuit current withstand (upon circuit configuration)	: 10 x(Nominal current)
•Dielectric withstand strength	
* Between live parts in open position	: 10 kV - 50 Hz - 1 min
* Between live parts and earth	: 10 kV - 50 Hz - 1 min
* Between auxiliary contacts and earth	: 2 kV - 50 Hz - 1 min
* Between motor (AC) and earth	: 2,5 kV - 50 Hz - 1 min

Mechanical Data

•Mechanical endurance (with respect to maintenance instructions. Higher endurance upon request)	: 1000 Cycles
•Typical duration of opening or closing operation	
* With motor operation	: Less than 16 seconds
* With pneumatic operation	: Less than 1 second
•Punctual contact temperature on live parts withstand without equipment damage	: 110° C

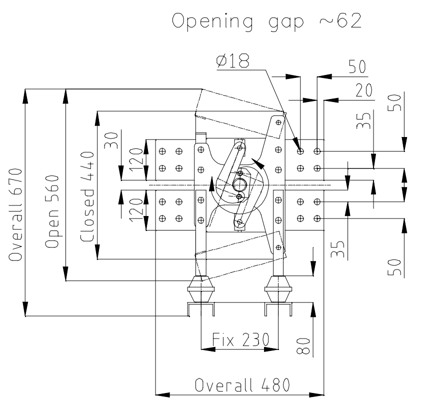
TECHNOLOGY

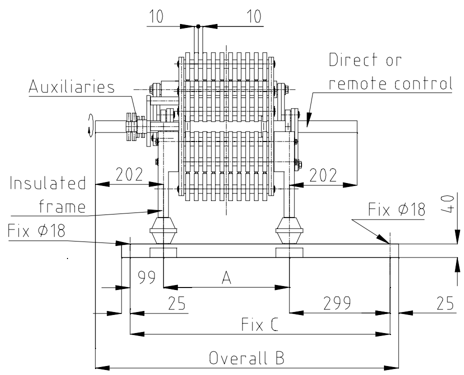
- All contacts fitted with solid silver, high-temperature brazed (special process)
- Visible break by direct viewing of mobile contacts
- Mechanically independant mobile contact arms with high-pressure springs
- Electrical contact with solid silver point-to-point contact tips
- Insulation with pre-impregnated self-extinguishing flanges and rods with long leakage paths
- Operation mechanism by a toggle-closed system
- Direct mounting on busbar
- Upon request, choice of input and output terminals in aluminum or silver-plated copper
- Upon request, two poles or change-over design by side association of two disconnectors

High Current Disconnectors

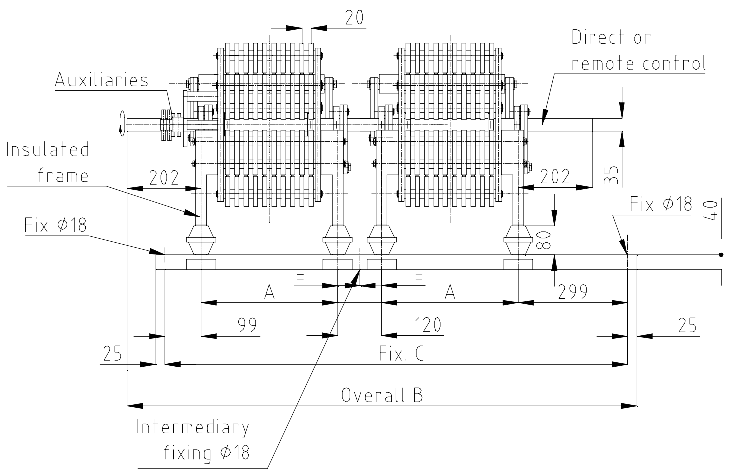
MAIN DIMENSIONS

SINGLE ASSEMBLY





DOUBLE ASSEMBLY



	ALUMINIUM					COPPER					DIMENSIONS		
	In (kA)	Nb. of blades	Blade Section	(A/mm²)	Weight (kg)	In (kA)	Nb. of blades	Blade Section	(A/mm²)	Weight (kg)	A (mm)	B (mm)	C (mm)
Single Assembly	5	2x3	80x15	0.69	47	6	2x2	80x12	1.04	55	212	738	610
	6	2x4	80x15	0.63	50	8	2x3	80x12	1.04	65	212	738	610
	8	2x5	80x15	0.67	55	10	2x4	80x12	1.04	75	212	738	610
						12	2x5	80x12	1.04	85	212	738	610
	10	2x6	80x15	0.69	62	15	2x6	80x12	1.12	95	272	798	670
	12	2x8	80x15	0.63	67	18	2x7	80x12	1.17	105	272	798	670
						20	2x9	80x12	1.16	125	302	828	700
	15	2x10	80x15	0.63	72	22	2x10	80x12	1.15	135	342	868	740
	18	2x11	80x15	0.68	76	25	2x11	80x12	1.18	145	342	868	740
						28	2x12	80x12	1.22	155	382	908	780
	20	2x13	80x15	0.64	86	30	2x13	80x12	1.20	165	382	908	780
						35	2x14	80x12	1.30	180	402	928	800
Double Assembly	25	4x8	80x15	0.65	145	40	4x8	100x12	1.04	230	272	1190	1062
						45	4x9	100x12	1.04	250	302	1225	1122
	30	4x10	80x15	0.63	155	50	4x10	100x12	1.04	270	342	1330	1202
	35	4x11	80x15	0.66	165	55	4x11	100x12	1.04	290	342	1330	1202
	40	4x13	80x15	0.64	175	60	4x12	100x12	1.04	330	382	1410	1282

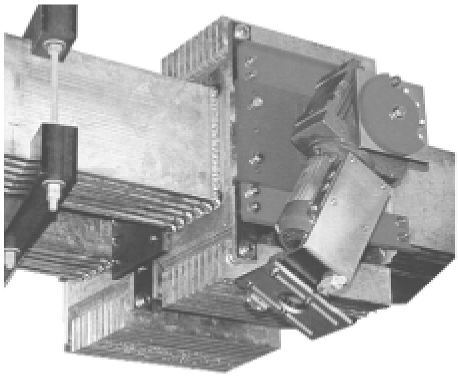
With its engineering capability in Saint-Loup-de-Naud (France), in Mannheim (Germany), and testing platform in Saint-Bonnet-de-Mure (France), FERRAZ SHAWMUT is poised to offer customized solutions to meet your most specific requirements:

* Adapted drives or control units
* Enclosures for switch protection
* Technical performance (short-circuit current capability, endurance ...)

High Current Disconnectors

HIGH-CURRENT DISCONNECTORS
PBD (Plain Bars Disconnectors)
2000 V DC - 20 kA to 160 kA
Single pole / Double pole / Change-over
Aluminum Terminals

- VISIBLE BREAK
- ABSORB DIMENSIONAL VARIATIONS DUE TO EXPANSIONS (FLEXIBLE JOINTS ARE NOT NECESSARY)
- LOW AND CONSTANT VOLTAGE DROP
- SUPPORTED BY BUSBARS (NO FRAME REQUIRED)
- POSSIBILITY OF COVERING UP TOTALLY ONE SIDE OF THE DISCONNECTOR (FOR PROTECTION & ISOLATION)
- EASY CONNECTIONS BY WELDING TO HIGH SECTION ALUMINUM BUSBARS
- LARGE CUSTOMIZATION POSSIBLE WITH :
  - ACTUATORS (MOTOR, PNEUMATIC, MANUAL)
  - AUXILIARIES (LIMIT SWITCHES, LOCKS, CONTROL BOXES)
  - ADAPTATION TO THE CONNECTING BUSBARS



MAIN TECHNICAL CHARACTERISTICS

Electrical Data

• Temperature rise at nominal current (with 40°C max. Ambient temperature) less than	: 65°C
• Voltage drop at nominal current less than	: 60 mV
• Peak short-circuit current withstand (upon circuit configuration)	: 10 x (Nominal current)
• Dielectric withstand strength	
* Between live parts in open position	: 10 kV - 50 Hz - 1 min
* Between live parts and auxiliary contacts	: 10 kV - 50 Hz - 1 min
* Between auxiliary contacts and earth	: 2 kV - 50 Hz - 1 min
* Between motor (AC) and earth	: 2 ,5 kV - 50 Hz - 1 min

Mechanical Data

• Built-in deformability (longitudinally (dL) / transversally (dT) / axially (dA)) (higher values available upon request)	: 20 / 20 / 20 mm
• Mechanical endurance (with respect to maintenance instructions). Higher endurance upon request	: 1000 Cycles
• Typical duration of opening or closing operation	
* With motor operation	: Less than 20 seconds
* With pneumatic operation	: Less than 1 second
• Ponctual contact temperature on live parts withstand without equipment damages	: 140° C

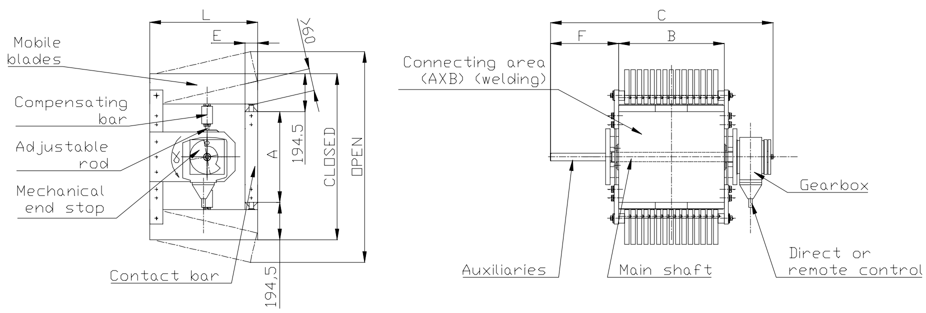
TECHNOLOGY

- All contacts are fitted with solid silver, high temperature brazed (special process)
- Mechanically independant mobile contact arms with high-pressure springs
- Electrical contact with solid pure silver, point to point, contact tips.
- Operation mechanism by a toggle closed system
- Upon request, two poles or change-over design by side association of two disconnectors

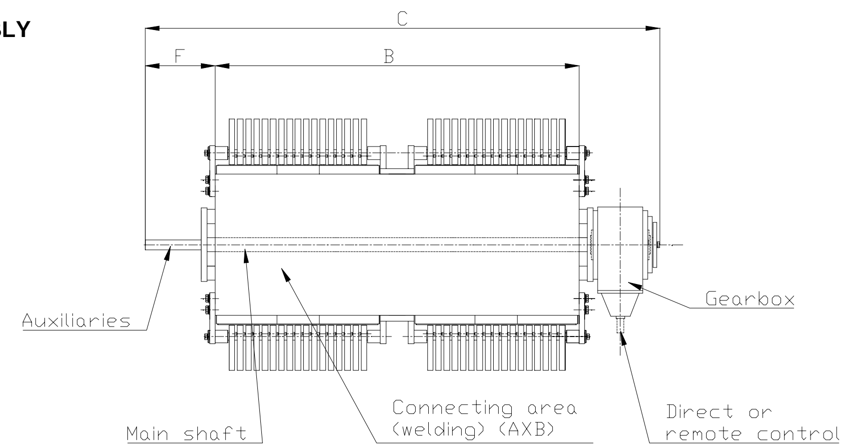
Very High Power Disconnectors

MAIN DIMENSIONS

SINGLE ASSEMBLY



DOUBLE ASSEMBLY



	Ir (kA)	Nb. of blades	blade (A/mm²)	B (mm)	C (mm)	E (mm)	L (mm)	Weight (kg) A=500
Simple Assembly	**20**	2 x 7	0,45	290	830	90	530	200
	25	2 x 9	0,43	350	890	90	530	220
	30	2 x 10	0,47	380	920	90	530	235
	35	2 x 12	0,46	440	1000	90	530	270
	40	2 x 14	0,45	500	1060	90	530	305
	45	2 x 16	0,44	560	1120	90	530	340
	50	2 x 18	0,43	620	1180	90	530	375
	55	2 x 20	0,45	680	1240	90	530	410
	60	2 x 22	0,47	740	1300	90	530	445
	70	2 x 24	0,46	800	1350	120	560	500
Double Assembly	**80**	4 x 14	0,45	1120	1660	120	560	750
	90	4 x 16	0,44	1240	1790	120	560	830
	100	4 x 17	0,46	1300	1850	120	560	880
	110	4 x 19	0,45	1420	1970	120	560	1080
	120	4 x 20	0,47	1480	2030	120	560	1120
	130	4 x 22	0,46	1600	2150	120	560	1200
	140	4 x 24	0,46	1720	2210	120	560	1290
	150	4 x 26	0,45	1840	2390	120	560	1370
	160	4 x 27	0,46	1900	2450	120	560	1500

Dimensions: A: standard = 500 mm (600 or 700 mm as option)
F: standard = 250 mm
Blade section = 160 x 20 mm²

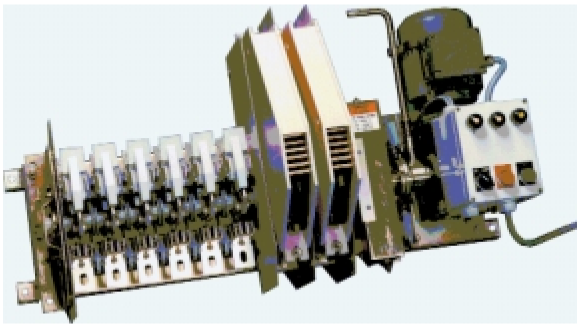
With its engineering capability in Saint-Loup-de-Naud (France), in Mannheim (Germany), and its testing platform in Saint-Bonnet-de-Mure (France), FERRAZ SHAWMUT is poised to offer customized solutions to meet your most specific requirements:

* Adapted drives or control units
* Enclosures for switch protection
* Technical performance (short-circuit current capability, endurance.).

DC Load Break Switches

DC LOADBREAK SWITCHES
IF TYPE
1000 V DC - 800 to 6300 A

- COST SAVING AGAINST DC CIRCUIT BREAKERS
- TRUE OPENING AND VISIBLE DISTANCE
- HIGH LOADBREAK AND LOADMAKE PERFORMANCES
- CLOSING UNDER LARGE SHORT CIRCUIT CURRENT



MAIN CHARACTERISTICS

Type : IF 1000 V / ... A	800A	1600A	2000A	2500A	3150A	3800A	4400A	5000A	5700A	6300A
Rated thermal current	800A	1600A	2000A	2500A	3150A	3800A	4400A	5000A	5700A	6300A
Short time withstand current over 1 min	2700A	4800A	6000A	7500A	9500A	11 500A	13 200A	15 000A	17 100A	19 000A
Peak short-circuit current	50 KA	75 kA *(minimum values as switch has not been tested further)*								
Rated short circuit making capacity	50 KA	66 kA *(minimum values as switch has not been tested further)*								
Rated insulation voltage	1000 V DC (1500 V DC under request)									
Rated breaking capacity	1000 V - 10 000 A - L/R = 5 ms									
Electrical endurance	100 cycles at 1000 V - 5000 A - L/R=20 ms *(minimum values as switch has not been tested further)* 600 cycles at 500 V - 4000 A - L/R = 100 ms									
Mechanical endurance	10 000 cycles									

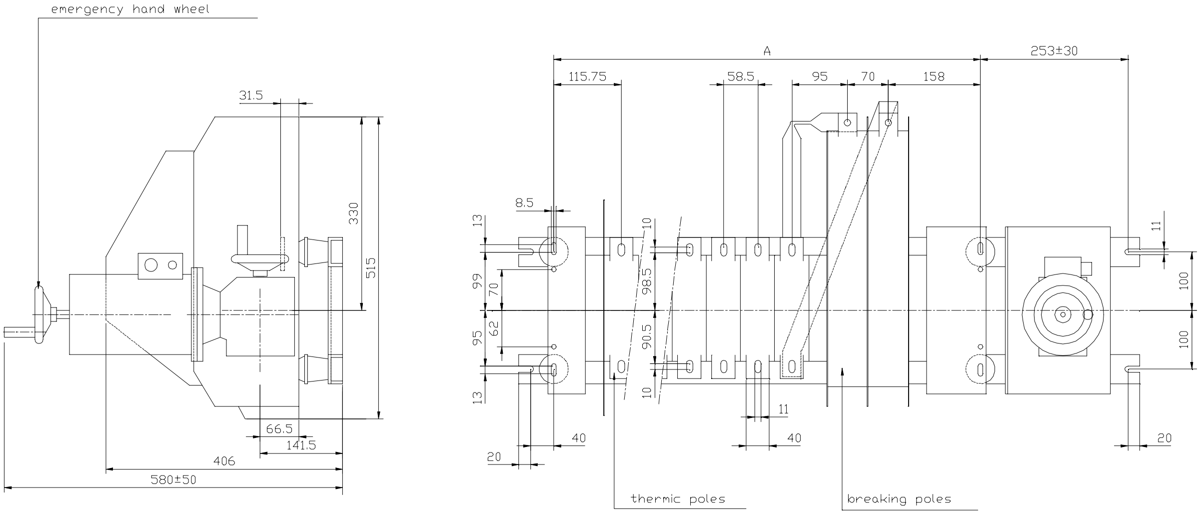
Typical voltage drop at nominal current : 36 mV

TECHNOLOGICAL FEATURES

- Separation between main contacts and arcing contacts
- Main contacts of silver-plated copper with two contact points per knife, and special shape for high withstand to short-circui t currents.
- Spring system made of stainless steel.
- Insulating parts made of self-extinguishing fiber glass polyester. Fire classification : UL 94 VO
- Conformity to norms NFC 20 040 catg C

DC Load Break Switches

DIMENSIONS AND WEIGHT



Type : IF 1000 V = / ... A	800	2 x 800	1600	2 x 1600	2000	2 x 2000	2500	2 x 2500	3150	2 x 3150	3800	4400	5000	5700	6300
Number of thermal poles	1	2 x 1	2	2 x 2	3	2 x 3	4	2 x 4	5	2 x 5	6	7	8	9	10
Number of breaking poles	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Dim. A	380,5	440,5	439	557,5	497,5	674,5	556	791,5	614,5	908,5	673	731,5	790	848,5	907
Weight without motorization (kg)	30	32	32	35	34	38	35	41	37	43	38	40	41	42	43

Approximate weight of motorization : 30 kg

REFERENCES IN THE WORLD

Subways : Athena, Barcelone, Bilbao, Cairo, Caracas, Dockland, Lille, Lisbone, Madrid, Marseille, Mexico, Midland metro, New-York, Paris, Santiago, Teheran. Light Rail : Grenoble, Nantes, Melbourne, Rouen, Strasbourg. Railways : French railways, British-rail.

YOUR CHOICE OF DESIGN

CAPABILITY OF MOUNTING IN ENCLOSURE





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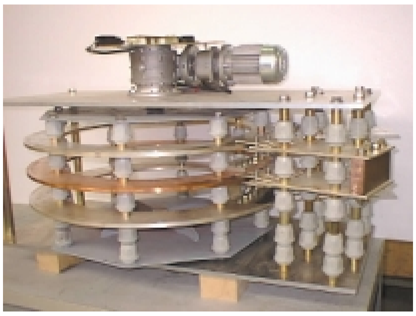
. Adapted drives or control units
. Enclosures for switch protection
. Technical performance specifications (short-circuit current capability, endurance ...)

For Driving types, please refer to our technical data sheet reference E601500
For Signalisations, please refer to our technical data sheet reference F601501

SLIPS RINGS

ROTATING CURRENT TRANSFER UNITS
SLIP RINGS Range 1000 A to 100 kA
Single Phase or Multi Phases

- LARGE ADAPTATIONS FOR WINDMILLS, ROTATING MOTORS FOR NAVY, ROTATING DRUMS FOR COPPER FOIL OR FOR LACKERING
- VERY LOW VOLTAGE DROP
- ACCEPT SPEED VARIATION AT CONTACT POINT
- VERY LOW MAINTENANCE REQUIREMENTS
- HIGH SHORT-CIRCUIT CURRENT REQUIREMENTS
- MODULAR DESIGN
- PATENTED DESIGN
- EASY ADAPTATION TO SEVERAL INSULATION VOLTAGES (500 V- 3,6 KV -7,2 KV...)



(reduced scale slip ring, made as show case on a larger project order)

MAIN TECHNICAL CHARACTERISTICS

Electrical Data

•Temperature rise at nominal current (with 40°C max. above ambient temperature) less than : 65°C
•Typical temperature rise at nominal current (with 40°C max. ambient temperature) : 5°C above busbars
•Voltage drop at contact point less than : 10 mV
•Peak short-circuit current withstand (upon circuit configuration) : 40 x (Nominal current)

Mechanical Data

•Mechanical endurance prior to maintenance (with respect to preventive maintenance instructions) : 500 000 meters at contact
•Typical Linear Rotation Speed at contact point up to : 14 m/min. (no higher speed has been yet tested)

•Self-alignement and compensation of dimensional tolerances between fixed parts and rotating parts up to : +/- 5 mm
•Ponctual temperature withstand without equipment damages : 140° C

TECHNOLOGY

•Contact point within a silver-based plated slip ring and a silver alloy rivet
•Mechanically independant pairs of contact fingers
•Capability (upon request) of absorbing regular rotation of +/- 5° without any wear and maintenance
•Insulation with Fiberglass reinforced polyester insulators
•Carefully studied shape of contact fingers for self-alignement, compensation of tolerances and electrodynamic withstand
•All stainless steel construction

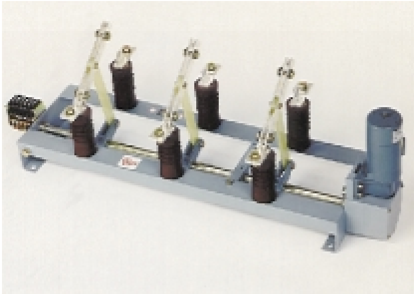
With its engineering capability in Saint-Loup-de-Naud (France), in Mannheim (Germany), and its testing platform in Saint-Bonnet-de-Mure (France), FERRAZ has it all for defining and offering customized solutions to meet your most specific requirements :

* Adapted technical performances (short-circuit current capability, endurance.).

Medium Voltage Disconnectors 400A to 1000A

HAS Range
12 kV, 24 kV, 36 kV
400 A to 1 000 A - up to 175 Hz
Number of poles : 1, 2, 3, ...

- LARGE ISOLATION AIR AND CREEPAGE PATH
- SELF-CLEANING BLADE CONTACTS
- TRUE OPENING AND VISIBLE DISTANCE
- RUGGED ANTI-TORSION CONSTRUCTION
- LARGE CUSTOMISATION WITH :
  MANUAL, MOTOR, PNEUMATIC DRIVES
  AUXILIARY SWITCHES, BLOCKING MAGNETS
- ACCORDING TO IEC 60 129
- DIMENSIONS FITTIN



ELECTRICAL CHARACTERISTICS

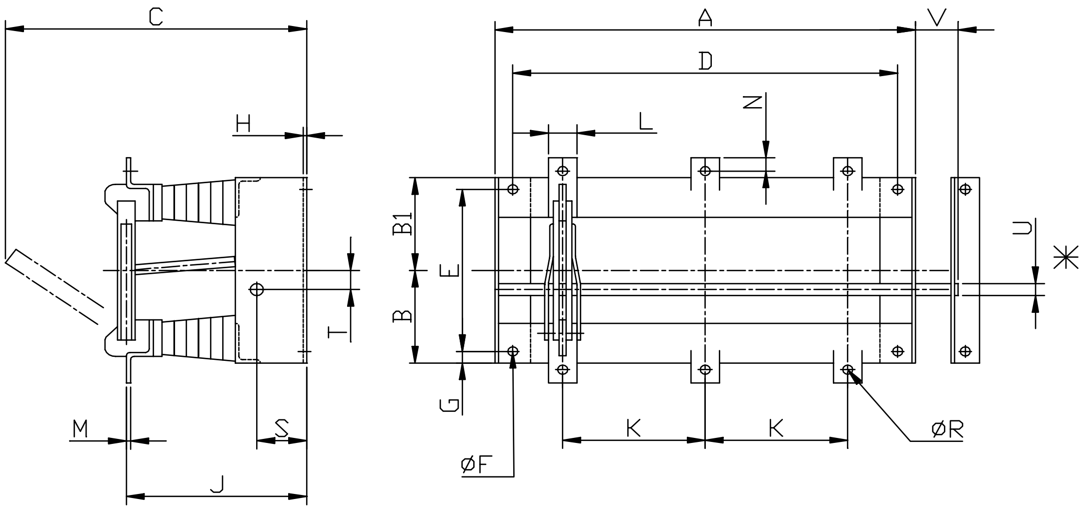
Rated insulation voltage	Rated thermal current	400 A	630 A	1000 A
12 kV	RMS 1 sec short-time withstand current	20 kA		40 kA
	Rated peak current	50 kA		100 kA
24 kV 36 kV	RMS 1 sec short-time withstand current	26 kA		30 kA
	Rated peak current	65 kA		75 kA

		12 kV	24 kV	36 kV
Dielectric withstand voltage 1 min/50 Hz	Phase to earth and between poles	28 kV	50 kV	70 kV
	Across the isolating distance	32 kV	60 kV	80 kV
Rated impulse withstand voltage BIL	Phase to earth and between poles	75 kV	125 kV	170 kV
	Across the isolating distance	85 kV	145 kV	195 kV

- No-load operation
- Indoor type - only vertical mounting
- Mechanical endurance: 50 000 cycles for I>1kA; 25 000 cycles for I<kA; 1 cycle = open + close
- Maximum temperature withstand at 130° C without damages to the switch
- Electrical contact by contact knives with pressed on hard silver contact rivets and silver-plated electrolytic copper plates
- Small making / breaking capacity
- Supporting insulators made of cast epoxy resin (fire classification according to UL94-V1)

Medium Voltage Disconnectors 400A to 1000A

MAIN DIMENSIONS



kV	Amp	No of poles	A	B=B1	C	D	E	FØ	G	H	J	K	L	M	N	RØ	S	T	UØ	V
			Dimensions mm																	
	400			320								-	30		15	11				
	630	1	142	340	450	92					253	-		6						180
	1000			358	465						261	-	40	10	20	14				
	400			320									30		15	11				
12	630	2	590	340	450	540	245			5	253			6			70	29	18	
	1000			358	465						261		40	10	20	14				
	400			320								200	30		15	11				60
	630	3	790	340	450	740					253			6						
	1000			358	465						261		40	10	20	14				
	400			420								-	30		15	11				
	630	1	142	440	685	92		14			383	-		6						230
	1000			458	700						391	-	40	10	20	14				
	400			420									30		15	11				
24	630	2	570	440	685	520	320		40		383			6			90	80	25	
	1000			458	700						391		40	10	20	14				
	400			420						6		320	30		15	11				185
	630	3	890	440	685	840					383			6						
	1000			458	700						391		40	10	20	14				
	400			500								-	30		15	11				
	630	1	142	520	885	92					503	-		6						340
	1000			538	900						511	-	40	10	20	14				
	400			500									30		15	11				
36	630	2	870	520	885	810	414		41		503			6			110	60	30	
	1000			538	900						511		40	10	20	14				
	400			500				24		50		450	30		15	11				200
	630	3	1320	520	885	1260					503			6						
	1000			538	900						511		40	10	20	14				

With its engineering capabilities in Mannheim (Germany) and Saint-Loup-de-Naud (France), and its testing platforms in Saint-Bonnet-de-Mure (France) and Newburyport (USA), Ferraz Shawmut offers customized solutions to meet your most specific requirements:

. Adapted drives or control units

. Technical performance specifications (short-circuit current capability, endurance, small load make / break capacity)

For Driving types, please refer to our technical data sheet reference S601558A

For Signalisations, please refer to our technical data sheet reference T601559A

Medium Voltage Disconnectors 1.6kA to 6.3kA

HAS Range
12 kV, 24 kV, 36 kV
1,6 kA to 6,3 kA - up to 175 Hz
Number of poles: 1, 2, 3, ...

- LARGE ISOLATION AIR AND CREEPAGE PATH
- SELF-CLEANING BLADE CONTACTS
- TRUE OPENING AND VISIBLE DISTANCE
- RUGGED ANTI-TORSION CONSTRUCTION
- LARGE CUSTOMISATION WITH :
  MANUAL, MOTOR, PNEUMATIC DRIVES
  AUXILIARY SWITCHES, BLOCKING MAGNETS
- ACCORDING TO IEC 60 129
- DIMENSIONS FITTING



ELECTRICAL CHARACTERISTICS

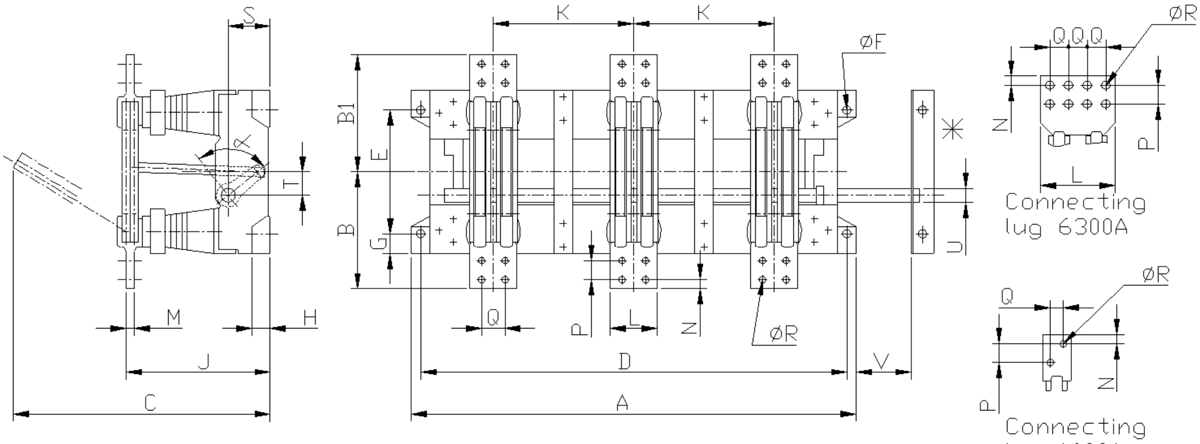
Rated Insulation voltage	Rated thermal current	1,6 kA	2,0 kA	3,15 kA	4,0 kA	6,3 kA
12 kV	RMS 1 sec short-time withstand current	52 kA	63 kA	71 kA	71 kA	81 kA
	Rated peak current	130 kA	160 kA	177 kA	177 kA	214 kA
24 kV 36 kV	RMS 1 sec short-time withstand current	37 kA	58 kA	64 kA	64 kA	77 kA
	Rated peak current	91 kA	144 kA	159 kA	159 kA	193 kA

		12 kV	24 kV	36 kV
Dielectric withstand voltage 1 min/50 Hz	Phase to earth and between poles	28 kV	50 kV	70 kV
	Across the isolating distance	32 kV	60 kV	80 kV
Rated impulse withstand voltage BIL	Phase to earth and between poles	75 kV	125 kV	170 kV
	Across the isolating distance	85 kV	145 kV	195 kV

- No-load operation
- Indoor type - Vertical mounting only
- Mechanical endurance: 50 000 cycles for I>1kA; 25 000 cycles for I<kA; 1 cycle = open + close
- Maximum temperature withstand at 130° C without damage to switch
- Electrical contact by contact knives with pressed on hard silver contact rivets and silver-plated electrolytic copper plates
- Small making / breaking capacity
- Supporting insulators made of cast epoxy resin (fire classification as per UL94-V1)

Medium Voltage Disconnectors 1.6kA to 6.3kA

MAIN DIMENSIONS



Switching angle ∝ = 100° Connecting lugs 1600A, 2000A , 3150A , 4000A

kV	kA	No of poles	A	B=B1	C	D	E	FØ	G	H	J	K	L	M	N	P	Q	RØ	S	T	UØ	V
			Dimensions in mm																			
	1,6			227	538						291	-	60	12	18	27	27					
	2		142		543	92	265		42,5		302	-	80			40	40		93			200
	3,15	**1**		250	560			14		6	308	-	100	18		50	50	14				
	4			274,5	600						347	-	120		20		60					
	6,3		190	294	645	130	344		31		367	-	160	20		40	40	18	85			215
	1,6			227	538						291		60	12	18	27	27					
	2		650		543	610	265	18	42,5	30	302	300	80				40		93			135
12	**3,15**	**2**		250	560						308		100	18			50	14		50		
	4			274,5	614						347		120		20	40	60					
	6,3		930	294	654	870	344	24	38	50	367	400	160	20			40	18	122		30	105
	1,6			227	538						291		60	12	18	27	27					
	2		950		543	910	265	18	42,5	30	302	300	80				40		93			135
	3,15	**3**		250	560						308		100	18			50	14				
	4			274,5	614						347		120		20	40	60					
	6,3		1330	294	654	1270		24		50	367	400	160	20			40	18				105
	1,6			267	740		344		38		406	-	60	12	18	27	27		122			
	2		142		745	92		14			417	-	80				40			75		300
	3,15	**1**		290	760					6	423	-	100	18			50	14				
	4			336,5	820						450	-	120		20	40	60					
	6,3		190	356	855	130	414		55		470	-	160	20			40	18	110	60	35	290
	1,6			267	740			18			406		60	12	18	27	27					
	2		720		745	660	344		38		417	350	80				40		122	75	30	245
24	**3,15**	**2**		290	760						423		100	18			50	14				
	4			336,5	820						450		120		20	40	60					
	6,3		980	356	855	920	414	24	41		470	450	160	20			40	18	110	60	35	180
	1,6			267	740					50	406		60	12	18	27	27					
	2		1070		745	1010	344	18	38		417	350	80				40		122	75	30	245
	3,15	**3**		290	760						423		100	18			50	14				
	4			336,5	820						450		120		20	40	60					
	6,3		1430	356	855	1370		24			470	450	160	20			40	18			35	180
	1,6			302	880		414		41		516	-	60	12	18	27	27		110	60		
	2		142		910	92		14			527	-	80				40				30	410
	3,15	**1**		325	950					6	533	-	100	18			50	14				
	4			376,5	994						550	-	120		20	40	60					
	6,3		190	396	1040	130	520	18	55		570	-	160	20			40	18	120	110	35	400
	1,6			302	880						516		60	12	18	27	27					
	2		960		910	900	414		41		527	450	80				40		110	60	30	285
36	**3,15**	**2**		325	950						533		100	18			50	14				
	4			376,5	994						550		120		20	40	60					
	6,3		1030	396	1040	970	520		55		570	500	160	20			40	18	120	110	35	290
	1,6			302	880			24		50	516		60	12	18	27	27					
	2		1410		910	1350	414		41		527	450	80				40		110	60	30	285
	3,15	**3**		325	950						533		100	18			50	14				
	4			376,5	994						550		120		20	40	60					
	6,3		1530	396	1040	1470	520		55		570	500	160	20			40	18	120	110	35	290

With its engineering capabilities in Mannheim (Germany) and Saint-Loup-de-Naud (France), and its testing platforms in Saint-Bonnet-de-Mure (France) and Newburyport (USA), Ferraz Shawmut offers customized solutions to meet your most specific requirements:

. Adapted drives or control units

. Technical performance specifications (short-circuit current capability, endurance, small load make / break capacity)

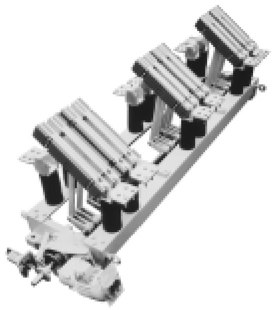
For Driving types, please refer to our technical data sheet reference S601558A

For Signalisations, please refer to our technical data sheet reference T601559A

Medium Voltage Disconnectors 8kA to 12kA

HAS Range
12 kV, 24 kV, 36 kV
8 kA to 12 kA - up to 175 Hz
Number of poles : 1, 2, 3, ...

- LARGE ISOLATION AIR AND CREEPAGE PATH
- SELF-CLEANING BLADE CONTACTS
- TRUE OPENING AND VISIBLE DISTANCE
- RUGGED ANTI-TORSION CONSTRUCTION
- LARGE CUSTOMIZATION POTENTIAL WITH: MANUAL, MOTOR, PNEUMATIC DRIVES AUXILIARY SWITCHES, BLOCKING MAGNETS
- COMPLYING WITH IEC 60 129
- DIMENSIONS TO FIT



ELECTRICAL CHARACTERISTICS

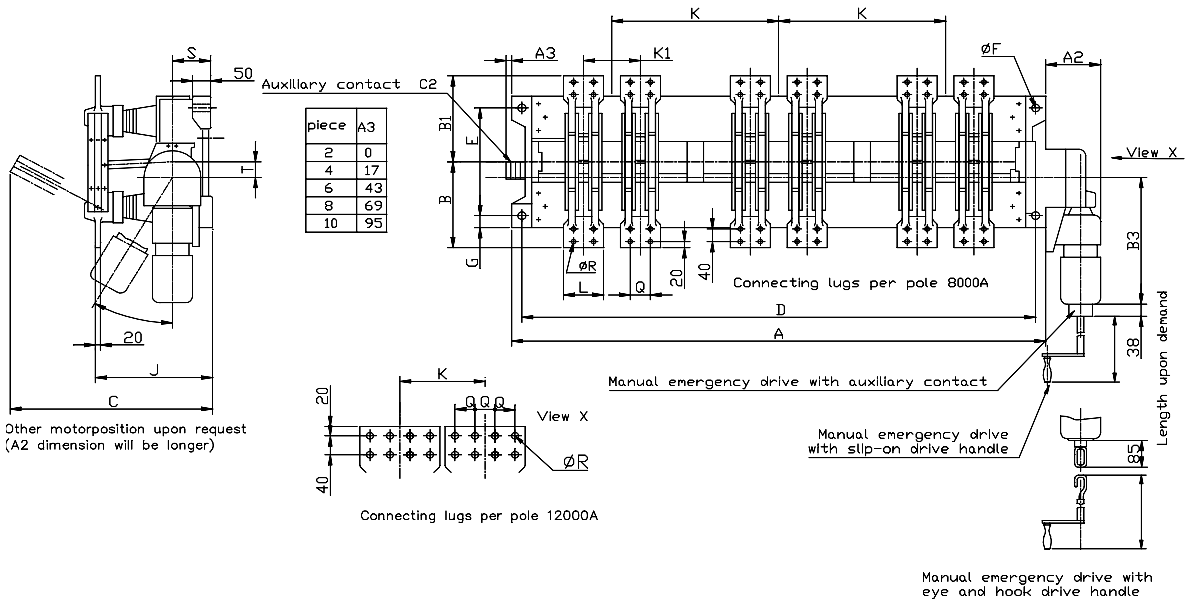
Rated Insulation voltage	Rated thermal current	8 kA	12 kA
12 kV	RMS 1 sec short-time withstand current	110 kA	121 kA
	Rated peak current	275 kA	300 kA
24 kV 36 kV	RMS 1 sec short-time withstand current	100 kA	110 kA
	Rated peak current	250 kA	275 kA

		12 kV	24 kV	36 kV
Dielectric withstand voltage 1 min/50 Hz	Phase to earth and between poles	28 kV	50 kV	70 kV
	Across the isolating distance	32 kV	60 kV	80 kV
Rated impulse withstand voltage BIL	Phase to earth and between poles	75 kV	125 kV	170 kV
	Across the isolating distance	85 kV	145 kV	195 kV

- No-load operation
- Indoor type - only vertical mounting
- Mechanical endurance: 50,000 cycles for I>1kA; 25,000 cycles for I<kA; 1 cycle = open + close
- Maximum temperature withstand at 130° C without damage to switch
- Electrical contact by contact knives with pressed on hard silver contact rivets and silver-plated electrolytic copper plates
- Small making / breaking capacity
- Supporting insulators made of cast epoxy resin (fire classification as per UL94-V1)

Medium Voltage Disconnectors 8kA to 12kA

MAIN DIMENSIONS



kV	kA	No of poles	A	A₂	B=B1	B₃	C	D	E	G	J	K	K₁	L	Q	RØ	S	T
			Dimensions in mm															
	8		700		274,5		614	640			347	-	170	120	60	14		
	12	1	730		294	390	654	670			367	-	185	160	40	18		
12	8		1200	189	274,5		614	1140			347		170	120	60	14		
	12	2	1230		294	405	654	1170	344	38	367		185	160	40	18	122	50
	8		1700		274,5		614	1640			347	500	170	120	60	14		
	12	3	1730	219	294	508	654	1670			367		185	160	40	18		
	8		700		336,5		820	640			450	-	170	120	60	14		
	12	1	730		356	390	855	670			470	-	185	160	40	18		
24	8		1300	189	336,5		820	1240			450		170	120	60	14		
	12	2	1330		356	405	855	1270	414	41	470		185	160	40	18	110	60
	8		1900		336,5		820	1840			450	600	170	120	60	14		
	12	3	1930	219	356	508	855	1870			470		185	160	40	18		
	8		700		376,5	390	994	640			550	-	170	120	60	14		
	12	1	730	189	396		1040	670			570	-	185	160	40	18		
36	8		1400		376,5	405	994	1340			550		170	120	60	14		
	12	2	1430		396		1040	1370	520	55	570		185	160	40	18	120	110
	8		2100	219	376,5	508	994	2040			550	700	170	120	60	14		
	12	3	2130		396		1040	2070			570		185	160	40	18		

With its engineering capabilities in Mannheim (Germany) and Saint-Loup-de-Naud (France), and its testing platforms in Saint-Bonnet-de-Mure (France) and Newburyport (USA), Ferraz Shawmut offers customized solutions to meet your most specific requirements:

. Adapted drives or control units

. Technical performance specifications (short-circuit current capability, endurance ,small load make / break capacity)

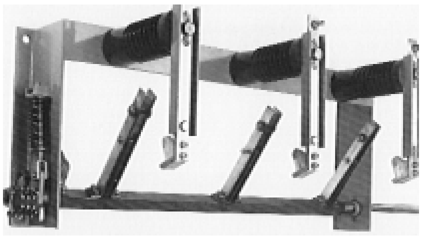
For Driving types, please refer to our technical data sheet reference S601558A

For Signalisations, please refer to our technical data sheet reference T601559A

Medium Voltage Earthing Disconnectors 8kA to 12kA

ETM Range
3,6 kV, 12 kV, 24 kV, 36 kV
Number of poles : 1, 2, 3, ...

- QUICK-ON MECHANISM
- CLOSING WITH SHORT-CIRCUIT CURRENT
- LARGE ISOLATION AIR AND CREEPAGE PATH
- TRUE OPENING AND VISIBLE DISTANCE
- RUGGED ANTI-TORSION CONSTRUCTION
- LARGE CUSTOMIZATION WITH:
  MANUAL OR MOTOR DRIVES
  AUXILIARY SWITCHES, BLOCKING MAGNETS
- COMPLYING WITH IEC 60 129
- DIMENSIONS TO FIT



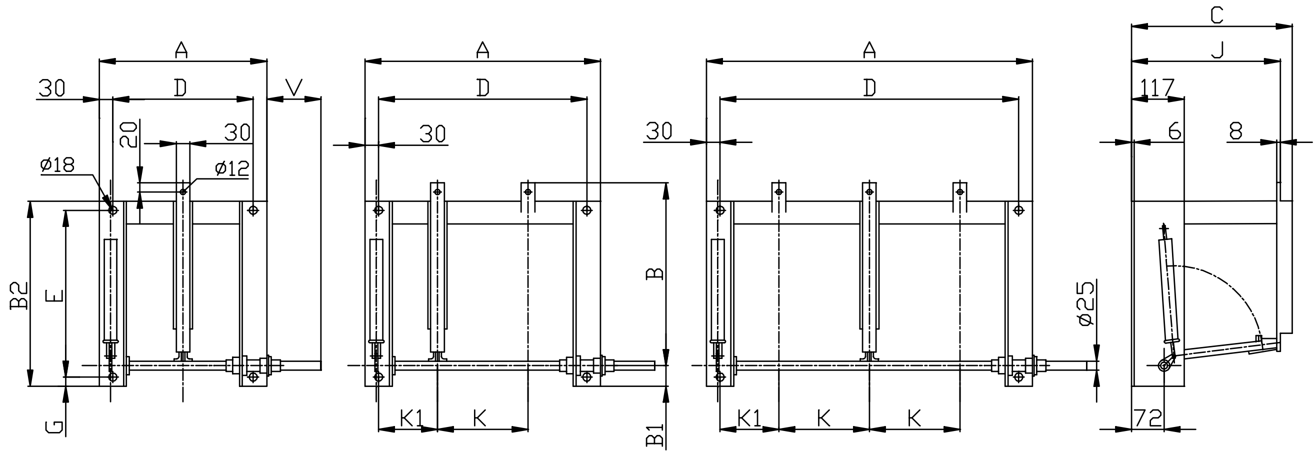
ELECTRICAL CHARACTERISTICS

Rated Insulation voltage		3,6 kV	12 kV	24 kV	36 kV
RMS 1 sec short-time withstand current		25 kA	38,5 kA	38,5 kA	38,5 kA
Rated peak current		50 kA	96 kA	96 kA	96 kA
Short-circuit making Capacity		50 kA	76 kA	76 kA	76 kA
Dielectric withstand Voltage 1 min/50 Hz	Phase to earth and between poles	10 kV	28 kV	50 kV	70 kV
	Across the isolating distance	12 kV	32 kV	60 kV	80 kV
Rated impulse withstand Voltage BIL	Phase to earth and between poles	40 kV	75 kV	125kV	170 kV
	Across the isolating distance	46 kV	85 kV	145 kV	195 kV

- Indoor type
- Mechanical endurance: 3,000 cycles without short-circuit interruption
- Maximum temperature withstand at 130° C without damages to the switch
- Electrical contact by contact knives with pressed on hard silver contact rivets and silver-plated electrolytic copper plates
- Supporting insulators made of cast epoxy resin (fire classification according to UL94-V1)
- Suitable for vertical mounting only

Medium Voltage Earthing Disconnectors 8kA to 12kA

MAIN DIMENSIONS



kV	No of poles	A	B	B_1	B_2	C	D	E	G	J	K	K_1	V
		Dimensions in mm											
3,6	1	320					260				-	-	
	2	445					385						
	3	570					510				125	130	
12	1	370	300		305	285	310	265		270	-	-	120
	2	670		45			610		20				
	3	970					910				300	155	
24	1	370					310				-	-	
	2	720	380		385	355	660	345		340			140
	3	1070					1010				350	155	
36	1	510					450				-	-	
	2	960	485	62	510	455	900	450	30	430			180
	3	1410					1350				450	225	

With its engineering capabilities in Mannheim (Germany) and Saint-Loup-de-Naud (France), and its testing platforms in Saint-Bonnet-de-Mure (France) and Newburyport (USA), Ferraz Shawmut offers customized solutions to meet your most specific requirements:

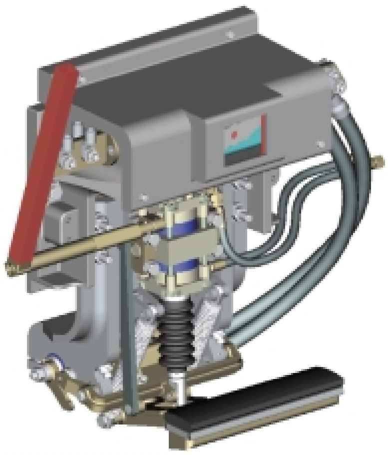
. Adapted drives or control units
. Technical performance specifications

For Driving types, please refer to our technical data sheet reference S601558A
For Signalisations, please refer to our technical data sheet reference T601559A

Current Collector Device

Bottom Contact

- RETRACTION BY PNEUMATIC MECHANISM AND MANUAL MEANS WITH REMOVABLE HANDLE
- INTEGRATED FUSE BOX
- FRICTIONLESS AND SHOCK-ABSORBING ARTICULATION
- LOW NOISE LEVEL
- VERY LOW MAINTENANCE COST
- FAST AND EASY SHOE REPLACEMENT
- LOW COST AND SIMPLE FIXING ON BOGIE



MAIN CHARACTERISTICS

Shoe material	Carbon, copper impregnated or other materials on request
Nominal contact force	120 N ±20 %
Retraction mechanism	pneumatic and manual
Rated voltage	up to 1000 V-DC
Nominal current	up to 1200 A
Working temperature	-20˚C to 60˚C
Maximal speed	130 km/h

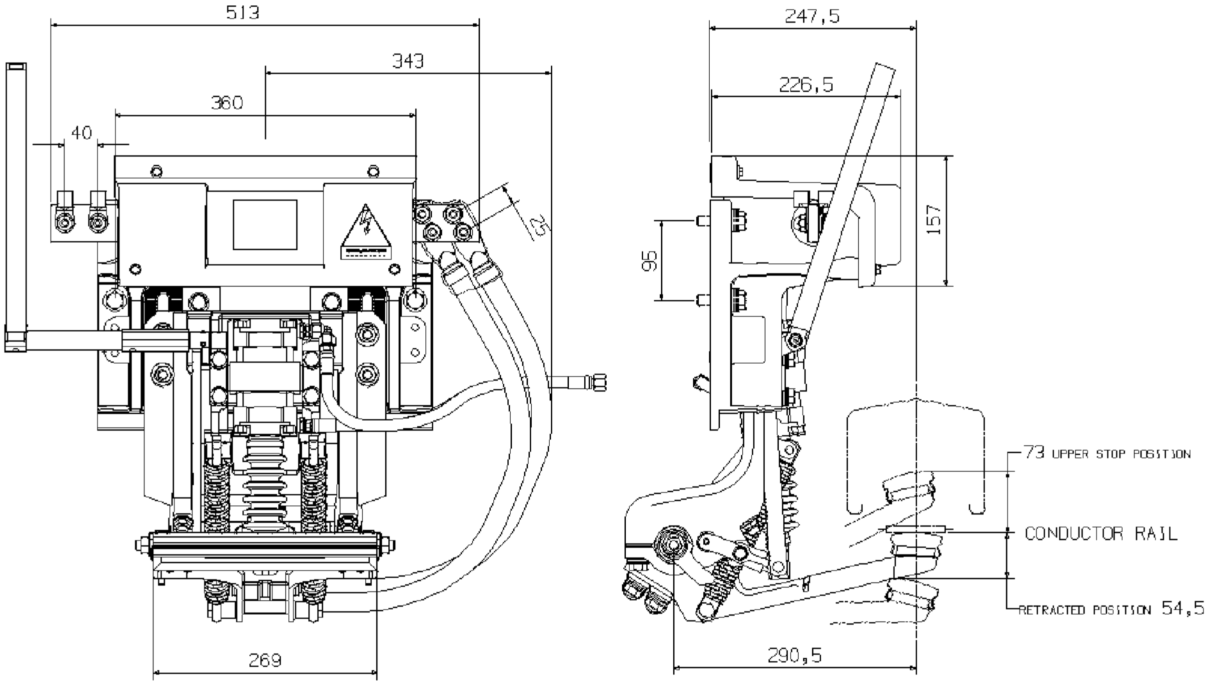
These characteristics are for general information only; many variations are possible.
(Eg: left and right side, weak link)

APPLICATION EXAMPLE

Taipei URC
Bangkok BTS

Bottom Contact

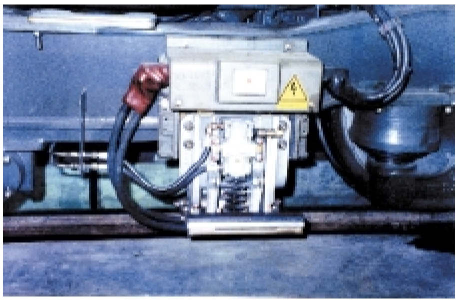
MOUNTING AND DIMENSIONS



REFERENCES AND DRAWINGS

Type of Current collector	DWG N°	Reference N°	Weight
Current collector M car left	D112161	K208665	39,30 kg
Current collector T car left	D113164	M208667	36,50 kg

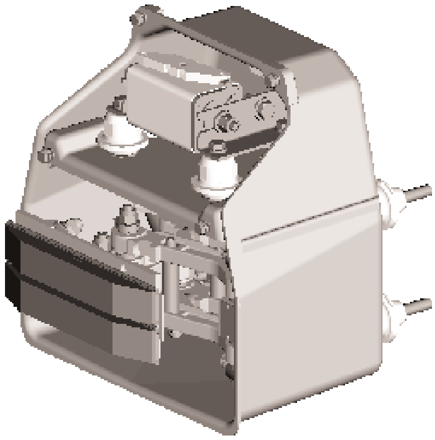
EXAMPLE OF ADAPTATION



Current Collector Device

Lateral Contact

- INTEGRATED FUSE BOX
- VERY LOW NOISE LEVEL
- VERY LOW MAINTENANCE COST
- FAST AND EASY SHOE REPLACEMENT
- LOW COST AND SIMPLE FIXING ON BOGIE
- PROTECTIVE HOUSING ON REQUEST



MAIN CHARACTERISTICS

Shoe material	Carbon, copper impregnated or other materials on request
Nominal contact force	100 N ±20%
Retraction mechanism	manual
Rated voltage	up to 1000 V-DC
Nominal current	up to 800 A
Working temperature :	-20˚C to 60˚C
Maximal speed	90 km/h

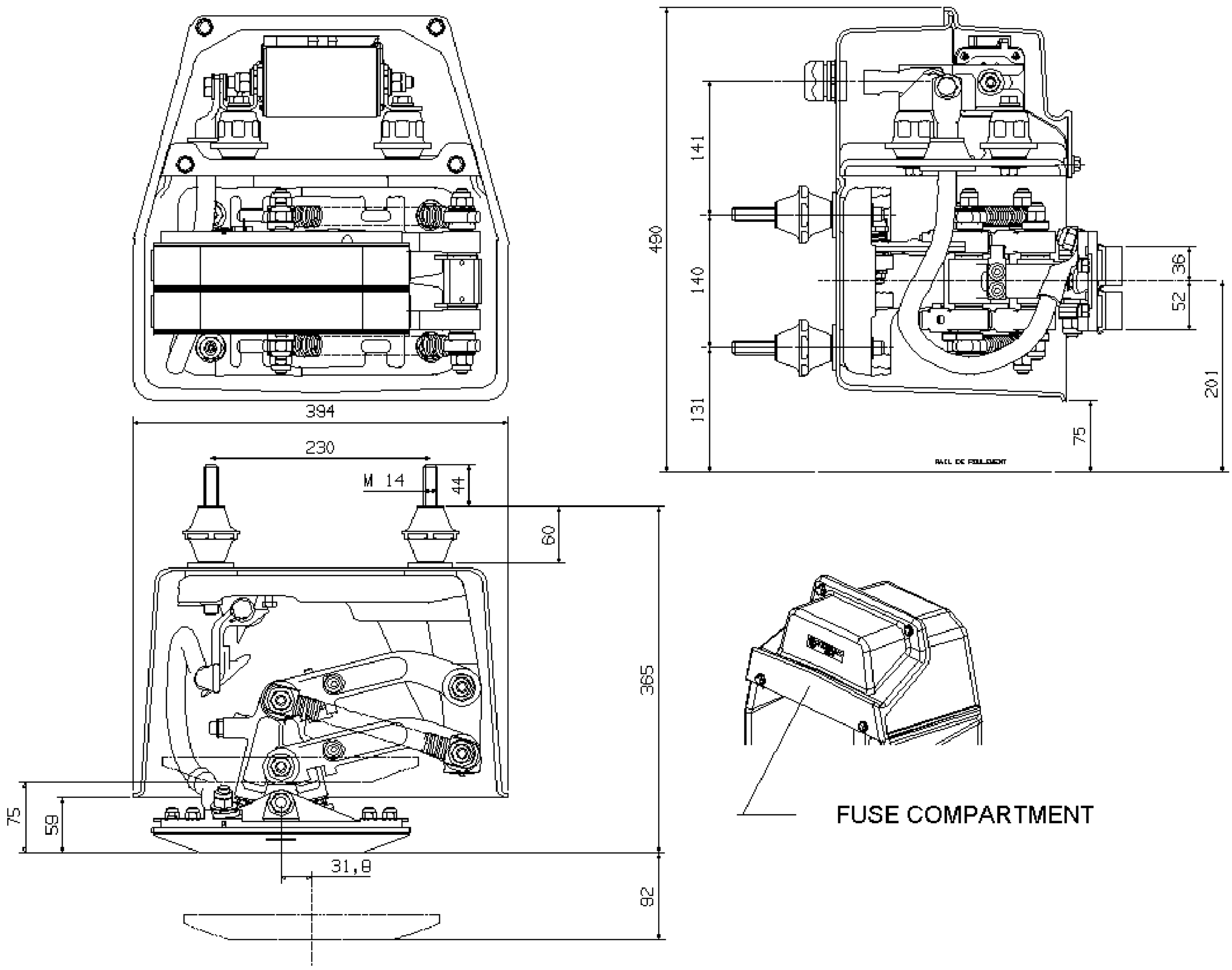
These characteristics are for general information only; many variations are possible.
(Eg: left and right side, weak link)

Thermal and Power Management

Current Collector Device

Lateral Contact

MOUNTING AND DIMENSIONS

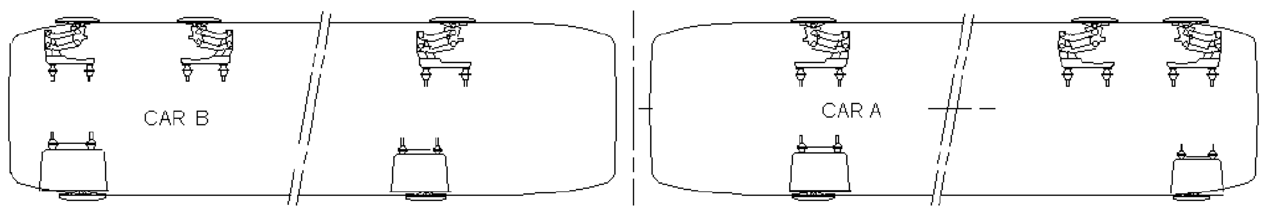


REFERENCES AND DRAWINGS

Example:

Type of Current collector	DWG N°	Reference N°	Fuse box	Weight
Current collector positive A	D113021	F208730	yes	33 kg
Current collector negative and masse A	D113022	H208732	no	23 kg

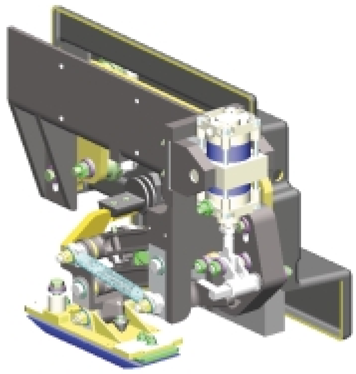
ADAPTATION EXAMPLE



Current Collector Device

Top Contact

- RETRACTION BY PNEUMATIC MECHANISM AND MANUALLY WITH REMOVABLE HANDLE
- LOW NOISE LEVEL
- VERY LOW MAINTENANCE COST
- FAST AND EASY SHOE REPLACEMENT
- LOW COST AND SIMPLE FIXING ON BOGIE



MAIN CHARACTERISTICS

Shoe material	Carbon, copper impregnated or other materials on request
Nominal contact force	120 N ± 20%
Retraction mechanism	pneumatic and manual
Rated voltage	up to 1000 V-DC
Nominal current	up to 1200 A
Working temperature	-20˚C to 60˚C
Maximal speed	90 km/h

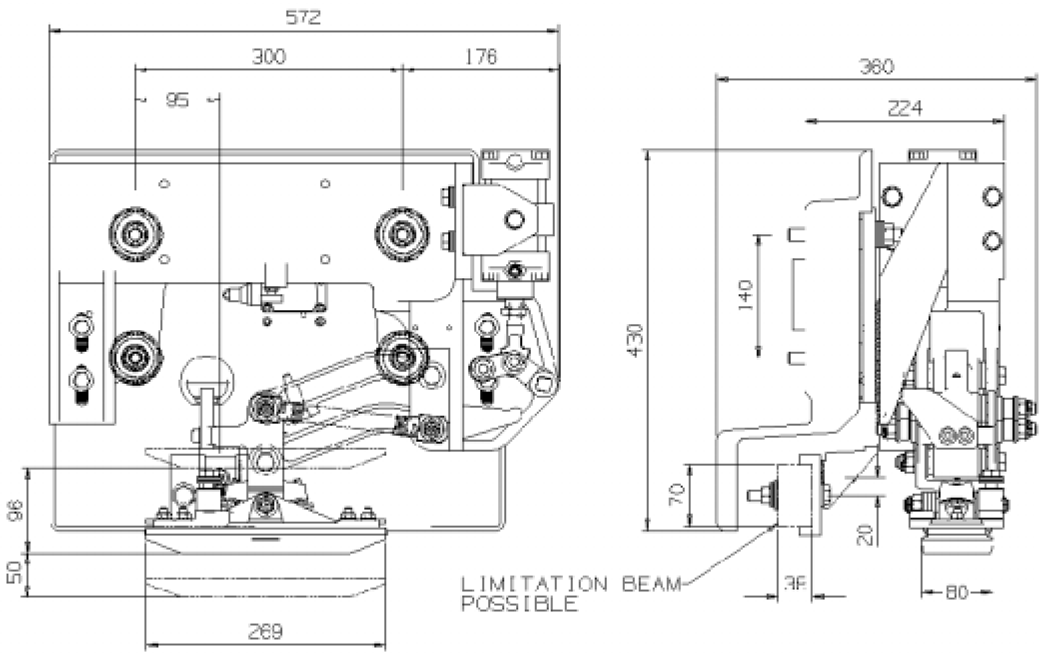
APPLICATION EXAMPLES

LISBON

Current Collector Device

Top Contact

MOUNTING AND DIMENSIONS



REFERENCES AND DRAWINGS

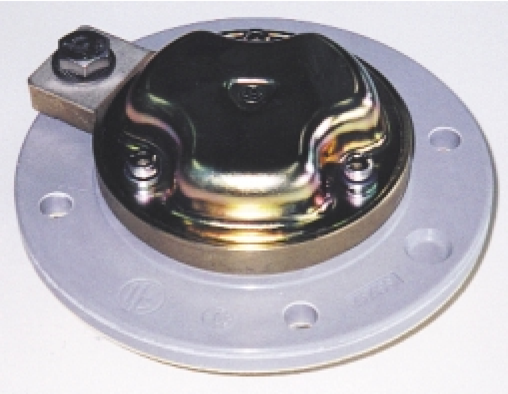
Type of Current collector	DWG N°	Reference N	Weight
Current collector	D 111586	Q203150	34,00 kg
Carbon shoe kit	B 109799	A207644	1,300 kg
Cast iron shoe kit	C109793	B207645	2,800 kg

Ground Return Current Unit

Axial Contact

3 BRUSHES 12.5 x 32

- PROTECTED AGAINST DUST PENETRATION, WATER SPLASH AND SHOCK
- PERMANENCE OF CONTACT
- VERY LOW MAINTENANCE COST
- FAST AND EASY BRUSH REPLACEMENT
- LOW COST AND SIMPLE FIXING ON BOGIE

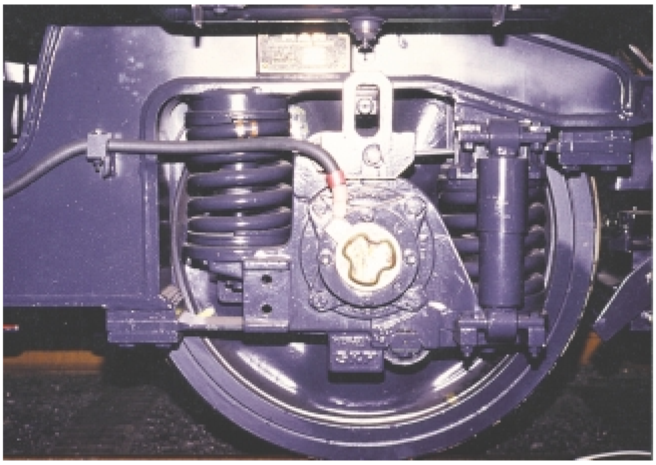


MAIN CHARACTERISTICS

Electrical	Rated current	300 A with copper graphite brushes
	Short time withstand current	7 kA RMS for 100ms
	I peak	19 kA
ERCU	Material of body	stainless bronze, connection tinned
	Material of cover	Steel, zinc plated
	Material of springs and screws	Stainless steel
	Material of insulating ring	Compound polyester
	Weight	1.250 kg (without brushes)

Possibility of supplying a complete adaptation including the contact disc, support, adapter etc...

EXAMPLES OF APPLICATION



Some references:

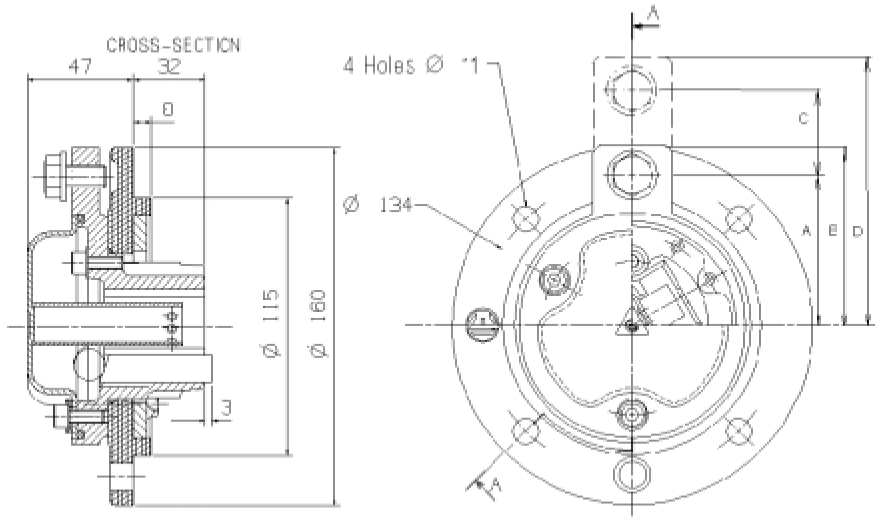
Railway : FERROCARIL SPAIN
EUROTUNEL FRANCE
TOKYU CAR JAPAN
KCRC HONG KONG

Metro : LOS ANGELES LACMTA,
SMRT SINGAPORE
CAIRO

Tramway : TORONTO, PORTLAND, ST JOSE,
BONN, ROTTERDAM, LOS ANGELES,
MELBOURNE

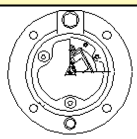
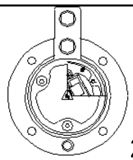
Axial Contact

MOUNTING AND DIMENSIONS



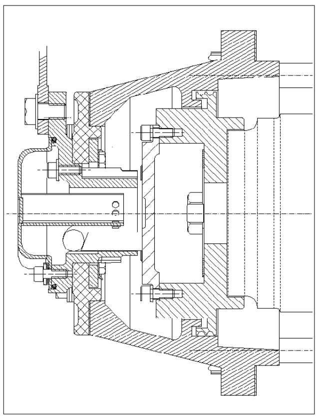
REFERENCES AND DRAWINGS

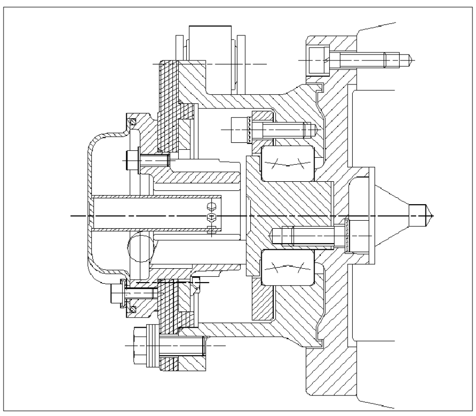
These characteristics are for general information only; many variations are possible.
Example:

Type connection	DWG N°	Reference N°	A	B	C	D	Note
 1x screw M 10	C67778	X067778	67	80	0	0	standard cover
	C113488	A209231	67	80	0	0	cover paint, brushes included
 2x screws M 10	C071832	M092011	67	0	28	108	cover paint
	C113871	R207659	67	0	28	108	standard cover
	C110327	E206498	74	0	48	140	standard cover

ADAPTATION EXAMPLES

Directly onto bearing box





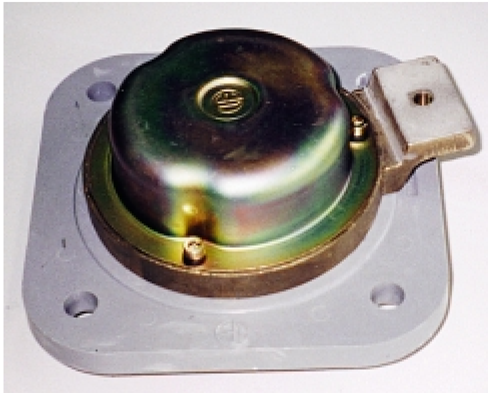
Directly onto the axle

Ground Return Current Unit

Axial Contact

3 BRUSHES 20 x 40

- PROTECTED AGAINST DUST PENETRATION, WATER SPLASH AND SHOCK
- PERMANENCE OF CONTACT
- VERY LOW MAINTENANCE COST
- FAST AND EASY BRUSH REPLACEMENT
- LOW COST AND SIMPLE FIXING ON BOGIE

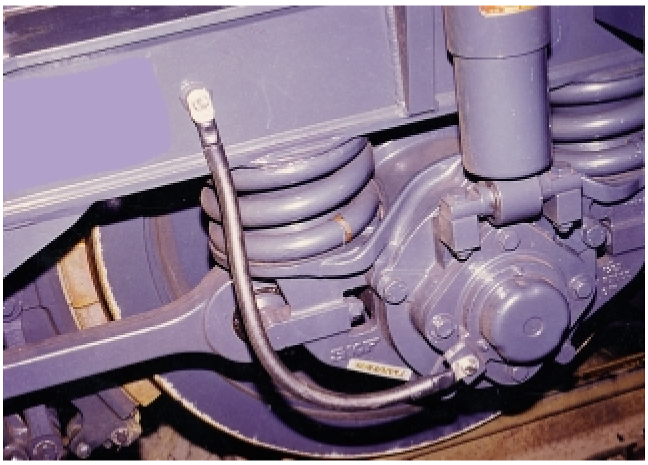


MAIN CHARACTERISTICS

Electrical	Rated current	300 A with copper graphite brushes
	Short time withstand current	7 kA RMS for 100ms
	I peak	19 kA
ERCU	Material of body	stainless bronze, connection tinned
	Material of cover	Steel, zinc plated
	Material of springs and screws	Stainless steel
	Material of insulating ring	Compound polyester
	Weight	1.250 kg (without brushes)

Possibility of supplying complete adaptation including the contact disc, support, adapter etc...

APPLICATION EXAMPLE



Some references:

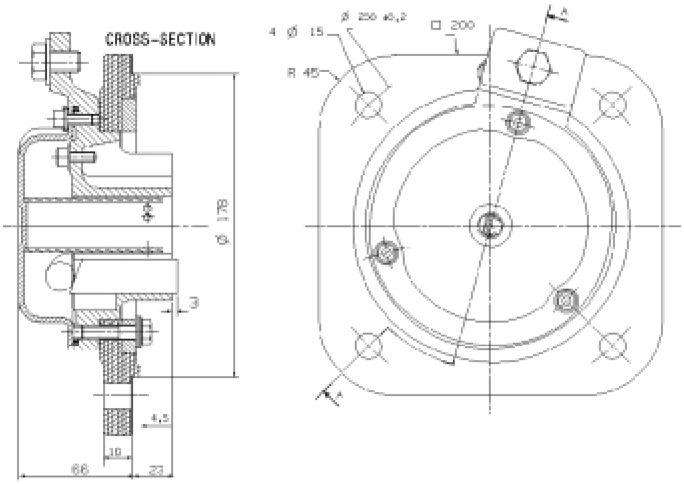
Railway: SNCF FRANCE, BRITISH RAIL, DEUTSCHE BAHN, ONCF MOROCCO, SATS SOUTH AFRICA, AMTRAK USA FERROCARILIES DE BASCOS SPAIN SNCB BELGIUM, NS NETHERLANDS

Metro: RATP PARIS, CAIRO, MADRID, ROME, CARACAS, LYON, SEOUL, SINGAPORE

Ground Return Current Unit

Axial Contact

MOUNTING AND DIMENSIONS

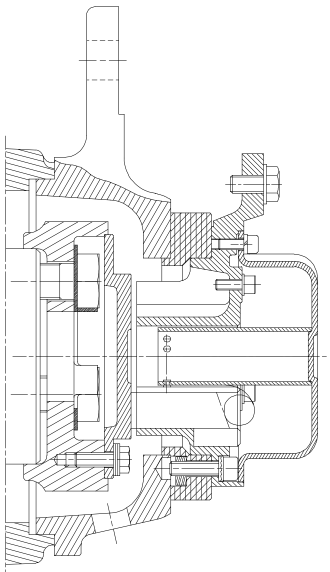


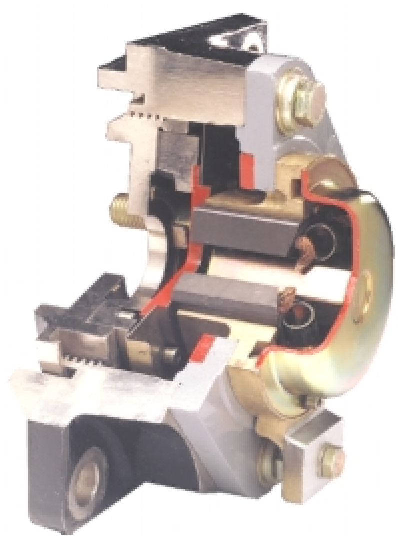
REFERENCES AND DRAWINGS

These characteristics are for general information only; many variations are possible..
Example:

Designation	Type connection	DWG N°	Reference N°	Note
ERCU	1x screw M 10	C69968	C069968	see sketch here above
ERCU	2x screws M 10	C109361	N205885	
Insulating ring	4 holes 15 on 200	C36558	M036558	see sketch here above
Insulating ring	6 holes 9 on 135	B67971	G067971	
Insulating ring	4 holes 12 on 175	C67905	K067905	
Insulating ring	5 holes 11 on 220	C36804	E036804	

ADAPTATION EXAMPLES





Ground Return Current Unit

Radial and Axial Contact

2 BRUSHES 20 x 25

- PROTECTED AGAINST DUST PENETRATION, WATER SPLASH AND SHOCK
- PERMANENCE OF CONTACT
- VERY LOW MAINTENANCE COST
- FAST AND EASY BRUSH REPLACEMENT
- LOW COST AND SIMPLE FIXING ON BOGIE
- INSULATION ON REQUEST



MAIN CHARACTERISTICS

Electrical	Rated current	260 A with copper graphite brushes
	Short time withstand current	6 kA RMS for 100ms
	I peak	16 kA
ERCU	Material of body	stainless bronze, connection tinned
	Material of cover	Stainless steel
	Material of springs and screws	Stainless steel
	Material of insulating plate	Polyester glass fibre
	Material of insulating bushing	Homopolymer acetal resin
	Constant brush pressure	34 kPa
	Weight	1,050 kg (without brushes)

Possibility of supplying complete adaptation including the contact disc, support, adapter etc.

APPLICATION EXAMPLES



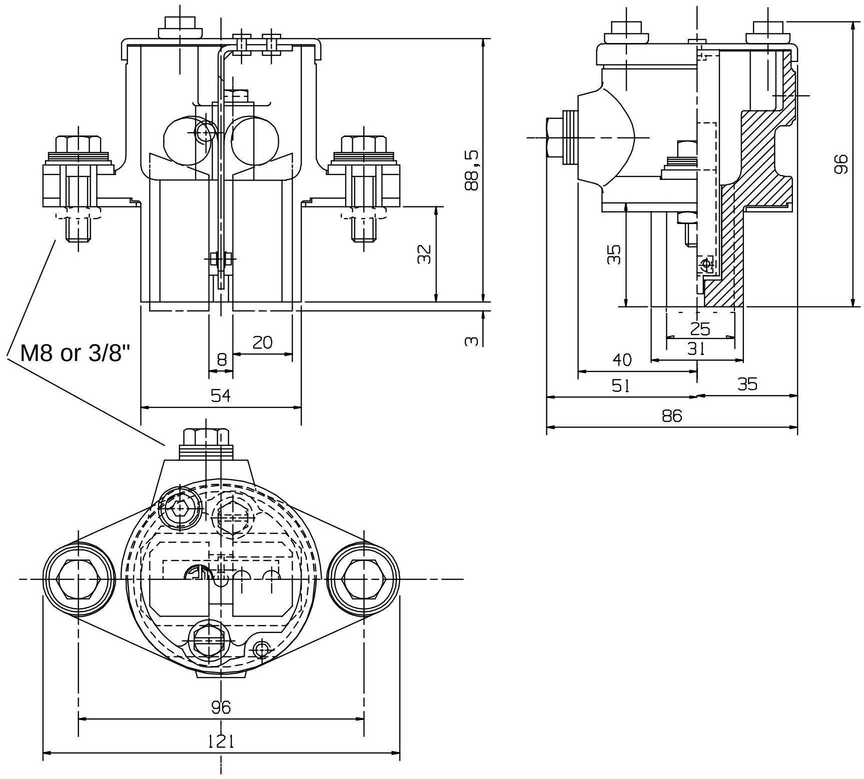
Some references:

Metro : TORONTO, Canada
METRO NORTH, Canada,
NYCTA 142 USA
SINGAPORE

Tramway : GENOA, Italy
NANTES, GRENOBLE, BOBIGNY, ROUEN, France
THE HAGUE Netherlands

Radial and Axial Contact

MOUNTING AND DIMENSIONS

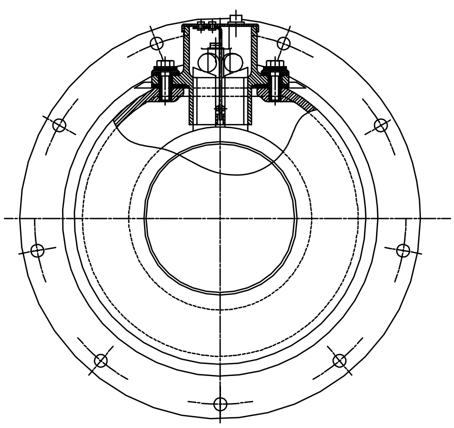


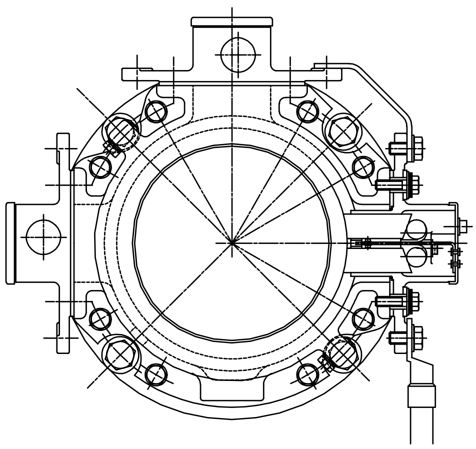
REFERENCES AND DRAWINGS

These characteristics are for general information only; many variations are possible.
Example :

Designation	Insulation	DWG N°	Reference N°	Screws	Note
ERCU	Insulated	C048786	D048786	metric	see sketch here above
ERCU	Non Insulated	C042427	R042427	metric	
ERCU	Insulated	C115027	E115027	UNC	cover : steel zinc plated
ERCU	Insulated	C114474	H210020	metric	painting

ADAPTATION EXAMPLE





Application Information

Need to know how? You've turned to the right place...literally.



Your problem: Whether your objective is optimum protection of motor control equipment, power or control transformers, cable wiring, or lighting and heating circuits —you need fast, accurate information to do the job right. Problem is, not all electrical pros have the same familiarity with circuit protection theories and practices.

Our solution: Every application has its unique challenges. But you'll find the path to a basic understanding of applied circuit protection principles in our Applications section. Be it a glossary of relevant electrical terms. An introduction to fuse construction. Guidance on reading and applying Peak Let-thru curves. Or a look at the most common applications.

Want more information fast? For technical assistance specific to your information, call our Applications/ Engineering experts today at 978-462-6662; 416-252-9371 in Canada; or visit our SolutionSite on the World Wide Web at http://www.ferrazshawmut.com.

INDEX TO APPLICATION INFORMATION

FUSE DEFINITIONS

Ampacity
The current a conductor can carry continuously without exceeding its temperature rating. Ampacity is a function of cable size, insulation type and the conditions of use.

Ampere Rating
The continuous current carrying capability of a fuse under defined laboratory conditions. The ampere rating is marked on each fuse. Class L fuses and E rated fuses may be loaded to 100% of their ampere rating. For all other fuses, continuous load current should not exceed 80% of fuse ampere rating.

Available Fault Current
The maximum short circuit current that can flow in an unprotected circuit.

Bolt-in Fuse
A fuse which is intended to be bolted directly to bus bars, contact pads or fuse blocks.

Contacts
The external live parts of the fuse which provide continuity between the fuse and the balance of the circuit. Also referred to as ferrules, blades or terminals.

Coordination
The use of overcurrent protective devices which will isolate only that portion of an electrical system which has been overloaded or faulted. See Selectivity.

Current-Limiting Fuse
A fuse which will limit both the magnitude and duration of current flow under short circuit conditions.

FUSE DEFINITIONS (Continued)

Current-Limiting Range
The available fault currents a fuse will clear in less than $^1/_2$ cycle, thus limiting the actual magnitude of current flow.

Dual Element Fuse
Often confused with time delay, dual element is a term describing fuse element construction. A fuse having two current responsive elements in series.

Element
A calibrated conductor inside a fuse which melts when subjected to excessive current. The element is enclosed by the fuse body and may be surrounded by an arc-quenching medium such as silica sand. The element is sometimes referred to as a link.

Fault
An accidental condition in which a current path becomes available which by-passes the connected load.

Fault Current
The amount of current flowing in a faulted circuit.

Fuse
An overcurrent protective device containing a calibrated current carrying member which melts and opens a circuit under specified overcurrent conditions.

I^2t (Ampere Squared Seconds)
A measure of the thermal energy associated with current flow. I^2t is equal to $(I_{RMS})^2 \times t$, where t is the duration of current flow in seconds.

> **Clearing I^2t** is the total I^2t passed by a fuse as the fuse clears a fault, with t being equal to the time elapsed from the initiation of the fault to the instant the fault has been cleared.
> **Melting I^2t** is the minimum I^2t required to melt the fuse element.

Interrupting Rating (Abbreviated I.R.)
The maximum current a fuse can safely interrupt. Some special purpose fuses may also have a "Minimum Interrupting Rating". This defines the minimum current that a fuse can safely interrupt.

Kiloamperes (Abbreviated kA)
1,000 amperes.

Limiter or Back-up Fuse
A special purpose fuse which is intended to provide short circuit protection only.

Overcurrent
Any current in excess of conductor ampacity or equipment continuous current rating.

Overload
The operation of conductors or equipment at a current level that will cause damage if allowed to persist.

Peak Let-Thru Current (I_p)
The maximum instantaneous current passed by a current- limiting fuse when clearing a fault current of specified magnitude.

Rejection Fuse Block
A fuse block which will only accept fuses of a specific UL class. Rejection is a safety feature intended to prevent the insertion of a fuse with an inadequate voltage or interrupting rating.

Rejection Fuse
A current-limiting fuse with high interrupting rating and with unique dimensions or mounting provisions.

Renewable Fuse
A fuse which can be restored for service by the replacement of its element.

Renewable Element or Link
The field-replaceable element of a renewable fuse. Also referred to as a renewal link.

Selectivity
A main fuse and a branch fuse are said to be selective if the branch fuse will clear all overcurrent conditions before the main fuse opens. Selectivity is desirable because it limits outage to that portion of the circuit which has been overloaded or faulted. Also called selective coordination.

Semiconductor Fuse
An extremely fast acting fuse intended for the protection of power semiconductors. Sometimes referred to as a rectifier or ultra fast fuse.

Short Circuit
Excessive current flow caused by insulation breakdown or wiring error.

Threshold Current
The minimum available fault current at which a fuse is current limiting.

Time Delay Fuse
A fuse which will carry an overcurrent of a specified magnitude for a minimum specified time without opening. The specified current and time requirements are defined in the UL/CSA/NOM 248 fuse standards.

Voltage Rating
The maximum voltage at which a fuse is designed to operate. Voltage ratings are assumed to be for AC unless specifically labeled as DC.

FUSE DESCRIPTIONS

High voltage (over 34,500V)

Expulsion-Type power fuses are available for nominal voltages of 46, 69, 115, 138 and 161KV in current ratings up to 400 amperes. ANSI (American National Standards Institute) Standards are followed.

Medium Voltage (601-34,500V)

Current-Limiting or Expulsion-Type power fuses are available for nominal voltages of 2.4, 2.75, 4.16, 5.5, 7.2, 8.25, 14.4, 15.5, 23 and 34.5 KV in current ratings up to 720 amperes. ANSI and UL Standards are followed.

Current-limiting motor starter fuses are available for nominal voltages of 2.4, 4.8 and 7.2KV in current ratings up to 36R (650A). These are special purpose R rated fuses for motor short circuit protection only and are not full-range power fuses. ANSI and UL Standards are followed.

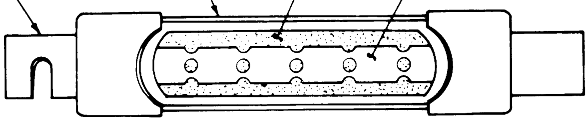
PT Fuses - Potential transformers require current limiting fuses or equivalent on the primary connection side. Standard PT primary voltages range from 2.4kV to 36kV. Since the power requirement is low (for relays, metering, etc.) fuses of the proper voltage are applied in the 1/2 to 5 ampere range. Several voltage ratings are available, physical sizes vary among manufacturers.

Low Voltages (600V or less)

Many types of low voltage fuses are classified and identified for use in 125, 250, 300, 480, or 600V circuits. UL/CSA/NOM standards are followed. Common types are briefly summarized below:

Summary of Low Voltage Fuses

VOLTAGE	FUSE TYPE	AMPERE RATING	INTERRUPTING RATING-KA	NOTES
UL CLASSIFICATIONS				
125	Plug	0-30	10	
250	Class H	0-600	10	Includes renewables
	Class K	0-600	50,100 or 200	Interchangeable with Class H
	Class RK1	0-600	200	One-end rejection
	Class RK5	0-600	200	One-end rejection
	Midget	0-30	10	13/32" x 1- 1/2"
300	Class T	0-1200	200	Very small dimensions
600, 480	Class G	0-60	100	13/32" diameter
600	Class H	0-600	10	Includes renewables
	Class J	0-600	200	600V dimensions. only
	Class K	0-600	50, 100 or 200	Interchangeable with Class H
	Class RK1	0-600	200	One-end rejection
	Class RK5	0-600	200	One-end rejection
	Class T	0-1200	200	Very small dimensions.
	Class CC	0-30	200	Midget one-end rejection
	Midget	0-30	10, 50 or 100	13/32" x 1- 1/2"
	Class L	601-6000	200	Bolt-in
OTHER TYPES				
130-4000	Semiconductor protection	0-2000	200	Many sizes UL component recognized
1000	Glass & Ceramic	0-30	up to 10	Automotive and electronic, 1/4" dia., 5 mm dia. Many sizes UL Listed & CSA certified
600	Cable protector	4/0-750 kcmil Cu or Al cables	200	Crimp type, bolt type or solid stud
600-4300	Capacitor	25-225	200	Variety of mountings
250, 600	Welder	70-600	200	Class H or Class J dimensions



FUSE CONSTRUCTION AND OPERATION

The typical fuse consists of an element which is surrounded by a filler and enclosed by the fuse body. The element is welded or soldered to the fuse contacts (blades or ferrules).

The element is a calibrated conductor. Its configuration, its mass, and the materials employed are selected to achieve the desired electrical and thermal characteristics. The element provides the current path through the fuse. It generates heat at a rate that is dependent upon its resistance and the load current.

The heat generated by the element is absorbed by the filler and passed through the fuse body to the surrounding air. A filler such as quartz sand provides effective heat transfer and allows for the small element cross-section typical in modern fuses. The effective heat transfer allows the fuse to carry harmless overloads. The small element cross section melts quickly under short circuit conditions. The filler also aids fuse performance by absorbing arc energy when the fuse clears an overload or short circuit.

When a sustained overload occurs, the element will generate heat at a faster rate than the heat can be passed to the filler. If the overload persists, the element will reach its melting point and open. Increasing the applied current will heat the element faster and cause the fuse to open sooner. Thus fuses have an inverse time current characteristic, i.e. the greater the overcurrent the less time required for the fuse to open the circuit.

This characteristic is desirable because it parallels the characteristics of conductors, motors, transformers and other electrical apparatus. These components can carry low level overloads for relatively long times without damage. However, under high current conditions damage can occur quickly. Because of its inverse time current characteristic, a properly applied fuse can provide effective protection over a broad current range, from low level overloads to high level short circuits.

HOW TO READ A TIME-CURRENT CURVE

A time-current characteristic curve for a specific fuse is shown as a continuous line and represents the opening time in seconds for that fuse for a range of overcurrents. The opening time is considered nominal unless noted otherwise. Several curves are traditionally shown on one sheet to represent a family of fuses. The family shown here is the Time Delay Class J AJT Amp-trap 2000 fuse.

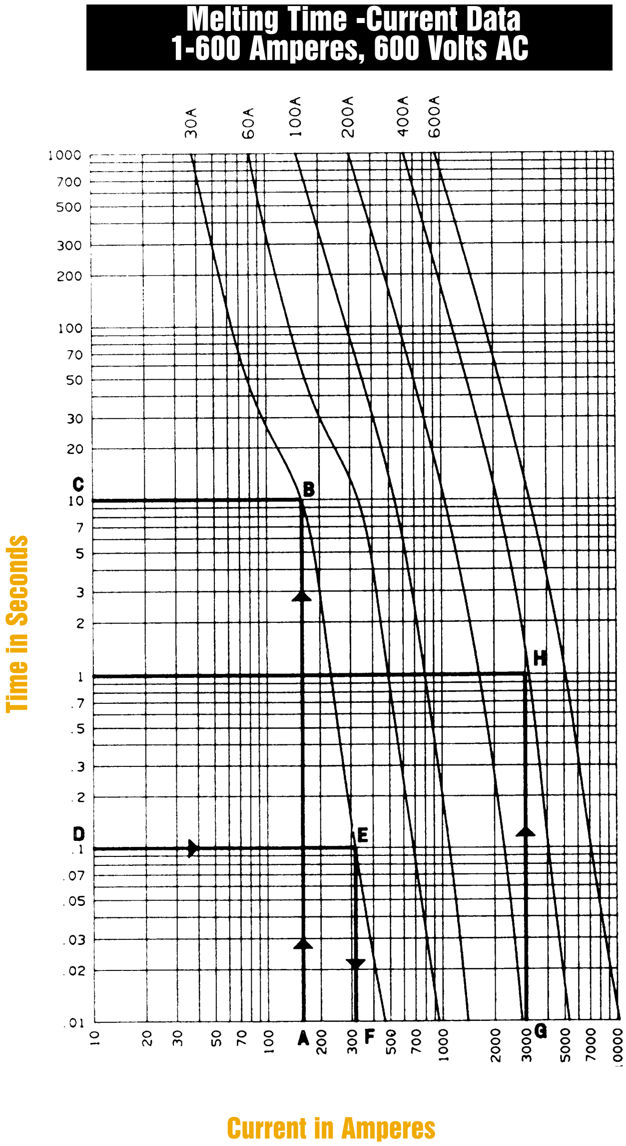
Information can be accessed from these curves in several ways:

❱ If a fuse has been selected, the designer can use the curve for that fuse to check its opening time versus a given overcurrent. Example: Using the 30 ampere fuse curve, what is the fuse opening time in seconds at a current of 160 amperes? At the bottom of the sheet (Current in Amperes) find 160 amperes (Pt. A) and follow that line straight up to the point where it intersects the 30A curve (Pt. B). Then follow that line to the left edge (Time in Seconds) and read 10 seconds. (pt. C). This tells us that the AJT30 will open in 10 seconds on a current of 160 amperes.

❱ Likewise, for the same fuse we might want to know what current will open the fuse in .1 second. At the side of the sheet (Time in Seconds) find .1 second (Pt. D) and follow that line to the right until it intersects the 30A curve (Pt. E). Then follow that line straight down to the bottom line (Current in Seconds) and read 320 amperes (Pt. F). This shows that the AJT30 requires an overcurrent of 320 amperes to open in .1 second.

❱ The curves can be used in other ways by the designer. For example, if a family has been chosen (i.e. Time Delay Class J AJT) and an opening time of approximately 1 second is required at 3000 amperes, what fuse in the family best meets this need? Find the 3000 ampere line at the bottom of the sheet (Pt. G) and follow it up to the 1 second line (Pt. H). The nearest curve to the right is the AJT400. If the point is not near a curve shown, other intermediate curves are available from the factory.

Sometimes the fuse family or type has not been chosen, so a design requirement can be presented to several family characteristic curves. One fuse type will emerge as a good choice. Voltage rating, interrupting rating, physical size, time delay, etc. are all considerations in the final choice.



LOW VOLTAGE FUSES FOR MOTOR PROTECTION

Code Requirements

The NEC or CEC requires that motor branch circuits be protected against overloads and short circuits. Overload protection may be provided by fuses, overload relays or motor thermal protectors. Short circuit protection may be provided by fuses or circuit breakers.

Overload Protection

The NEC or CEC allows fuses to be used as the sole means of overload protection for motor branch circuits. This approach is often practical with small single phase motors. If the fuse is the sole means of protection, the fuse ampere rating must not exceed the values shown in Table 1.

Most integral horsepower 3 phase motors are controlled by a motor starter which includes an overload relay. Since the overload relay provides overload protection for the motor branch circuit, the fuses may be sized for short circuit protection.

Short Circuit Protection

The motor branch circuit fuses may be sized as large as shown in Table 2 when an overload relay or motor thermal protector is included in the branch circuit. Time delay fuse ratings may be increased to 225% and non-time delay fuse ratings to 400% (300% if over 600 amperes) if the ratings shown in Table 2 will not carry motor starting current.

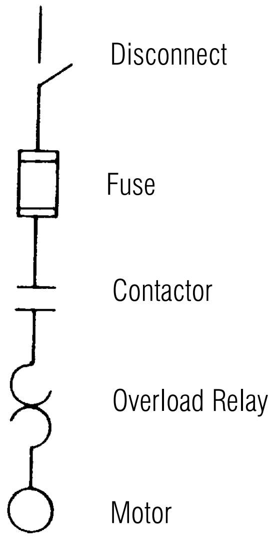
Some manufacturers' motor starters may not be adequately protected by the maximum fuse sizing shown in Table 2. If this is the case, the starter manufacturer is required by UL 508 to label the starter with a maximum permissible fuse size. If so labeled, this maximum value is not be be exceeded.

Where the percentages shown in Table 2 do not correspond to standard fuse ratings the next larger fuse rating may be used. Standard fuse ratings in amperes:

15	20	25	30	35	40	45	50
60	70	80	90	100	110	125	150
175	200	225	250	300	350	400	450
500	600	700	800	1000	1200	1600	2000
2500	3000	4000	5000	6000			

Fuse Selection Guidelines

What fuse type and ampere rating is best for a given application? The answer depends upon the application and objective to be met. Here are some suggestions.



Motor Branch Circuit

Table 1- Maximum Fuse Rating for Overload Protection

MOTOR SERVICE FACTOR or MARKED TEMPERATURE RISE	FUSE RATING AS %* MOTOR FULL LOAD
Service factor of 1.15 or greater	125
Marked temperature rise not exceeding 40°C	125
All others	115

* These percentages are not to be exceeded.

Table 2- Maximum Fuse Rating For Short Circuit Protection

TYPE OF MOTOR	FUSE RATING AS % MOTOR FULL LOAD*	
	FUSE TYPE	
	NON-TIME DELAY	TIME DELAY
All Single-phase AC motors	300	175
AC polyphase motors other than wound-rotor:		
Squirrel Cage		
Other than Design E	300	175
Design E	300	175
Synchronous	300	175
Wound rotor	150	150
Direct-current (constant voltage)	150	150

* The non-time delay ratings apply to all class CC fuses.

LOW VOLTAGE FUSES FOR MOTOR PROTECTION (Continued)

Time Delay vs. Non-Time Delay

Time delay fuses are the most useful fuses for motor branch circuit application. A time delay fuse can be sized closer to motor full load current, providing a degree of overload protection, better short circuit protection, and possible use of a smaller disconnect switch.

Which Fuse Class?

UL Classes RK5, RK1, and J are the most popular. The Class RK5 (Tri-onic®) is the least expensive. The Class RK1 (Amp-trap®) is used where a higher degree of current limitation is required for improved component protection or system coordination. The RK5 and RK1 are dimensionally interchangeable.

Since its 1983 introduction, the Class J time delay fuse (Shawmut AJT) has become an increasingly popular choice. The AJT provides a higher degree of current limitation than the RK1. More important, the AJT is approximately half the physical size of the Class RK5 and RK1 fuses.

What Ampere Rating?

The selection of fuse ampere rating is a matter of experience and personal preference. Some prefer to size time delay fuses at 125% of motor full load amperes. This sizing will provide a degree of overload protection for motors with a service factor of 1.15. Sizing fuses at 125% of motor nameplate amperes in some applications may result in nuisance fuse openings. Time delay fuses sized at 125% may open at motor locked rotor current before some NEMA Class 20 overload relays operate. Nuisance fuse openings may result if Class RK1 or Class J fuses are sized at 125% of motor full load current. These fuses are more current limiting than the RK5 and have less short time current carrying capability.

Sizing time delay fuses between 125% and 150% of motor full load current provides advantages. The fuse will coordinate with NEMA Class 20 overload relays. Nuisance fuse opening will virtually be eliminated and effective short circuit protection will be maintained.

Protecting IEC Style Motor Starters

The new IEC European style motor starters and contactors are becoming increasingly popular but they present different problems in protection. These devices represent substantial savings in space and cost but they have a lower withstand capability than their NEMA counterparts.

In order to achieve the same level of protection for IEC style devices that we expect for NEMA devices, the AJT Class J Time Delay fuse is the best choice, sized at 1.25 to 1.50 times motor full load amperes. Also, the AJT has the advantage of being half the size of RK5 and RK1 fuses and thereby fits the trim IEC package.

Single Phase Motor Fuse Selection UL Class RK5 - Tri-onic® (TR)

MOTOR HP	FULL LOAD AMPERES	RECOMMENDED FUSE AMPERE RATING: MINIMUM 1.0 SF	MINIMUM 1.15 SF	TYPICAL	HEAVY LOAD
115V-RK5-TR (Tri-onic)					
1/6	4.4	5-6/10	5-6/10	6-1/4	8
1/4	5.8	7	8	9	12
1/3	7.2	9	10	12	15
1/2	9.8	12	12	15	17.5
3/4	13.8	15	17-1/2	20	25
1	16	17-1/2	20	25	30
1-1/2	20	20	25	30	35
2	24	25	30	35	40
3	34	35	40	50	60
5	56	60	70	80	100
7-1/2	80	90	100	125	150
10	100	110	125	150	175
115V-CC-ATDR					
1/8	4.4	8	-	15	17-1/2
1/4	5.8	12	-	20	20
1/3	7.2	15	-	25	25
1/2	9.8	20	-	30	-
3/4	13.8	30	-	-	-
230V-RK5-TR (Tri-onic)					
1/6	2.2	2-1/2	2-8/10	3-1/2	4
1/4	2.9	3-2/10	3-1/2	4-1/2	5.6
1/3	3.6	4	4-1/2	5-6/10	7
1/2	4.9	5-6/10	6-1/4	7	9
3/4	6.9	8	9	10	15
1	8	9	10	12	15
1-1/2	10	10	12	15	17-1/2
2	12	12	15	17-1/2	25
3	17	17-1/2	20	25	30
5	28	30	35	40	50
7-1/2	40	45	50	60	70
10	50	60	60	75	90
230V-CC-ATDR					
1/8	2.2	4	-	7	8
1/4	2.9	6	-	9	10
1/3	3.6	7	-	12	15
1/2	4.9	10	-	15	17-1/2
3/4	6.9	15	-	20	25
1	8	17-1/2	-	25	30
1-1/2	10	20	-	30	-
2	12	25	-	-	-

Minimum - Largest fuse rating which will provide both overload and short circuit protection per the code. Choosing this fuse rating eliminates the need for an overload relay. Nuisance fuse opening may occur if motor is loaded to its rating.

Typical - Suggested rating when fuse is used in conjunction with an overload relay. Fuse sized near 150% of motor full load current.

Heavy Load - In accordance with Table 2. If this fuse is not sufficient to start the load, it may be increased to a maximum of 225% of full-load amperes. This column should be used for Design E and high efficiency Design B motor fuse sizing.

LOW VOLTAGE FUSES FOR MOTOR PROTECTION (Continued)

Three Phase Motor Fuse Selection UL Classes RK5, RK1 and J

MOTOR HP	FULL LOAD AMPERES	RECOMMENDED FUSE AMPERE RATING — MOTOR ACCELERATION TIMES								
		MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.
208V		RK5–TR (Tri-onic®)/RK1–A2D			J–AJT			UL CLASS CC ATDR		
1/2	2.4	3	3-1/2	4-1/2	3	3-1/2	4-1/2	5	8	10
3/4	3.5	4-1/2	5	6-1/4	4-1/2	5	6-1/4	7	10	15
1	4.6	6	7	9	6	7	9	10	15	17-1/2
1-1/2	6.6	8	10	12	8	10	12	15	20	25
2	7.5	9	10	15	9	10	15	17-1/2	20	30
3	10.6	15	15	20	15	15	20	25	30	-
5	16.8	20	25	30	20	25	30	-	-	-
7-1/2	24.2	30	35	45	30	35	45	-	-	-
10	30.8	40	45	60	40	45	60	-	-	-
15	46.2	60	70	90	60	70	90	-	-	-
20	60	75	90	110	75	90	110	-	-	-
25	75	90	110	150	90	110	150	-	-	-
30	88	110	150	175	110	150	175	-	-	-
40	114	150	175	200	150	175	200	-	-	-
50	143	175	225	300	175	225	300	-	-	-
60	169	200	250	300	200	250	300	-	-	-
75	211	250	350	400	250	350	400	-	-	-
100	273	350	400	500	350	400	500	-	-	-
125	343	450	500	600	450	500	600	-	-	-
150	396	500	600	-	500	600	-	-	-	-
230V		RK5–TR (Tri-onic®)/RK1–A2D			J–AJT			UL CLASS CC ATDR		
1/2	2.2	2-8/10	3-1/2	4	3	3-1/2	4	5	7	9
3/4	3.2	4	5	6	4	5	6	8	10	12
1	4.2	5	6-1/4	8	5	6-1/4	8	10	12	15
1-1/2	6	8	9	12	8	9	12	15	17-1/2	25
2	6.8	8	10	12	8	10	12	17-1/2	20	25
3	9.6	12	15	17-1/2	12	15	17-1/2	20	30	-
5	15.2	20	25	30	20	25	30	-	-	-
7-1/2	22	30	35	40	30	35	40	-	-	-
10	28	35	40	50	35	40	50	-	-	-
15	42	50	60	80	50	60	80	-	-	-
20	54	70	80	100	70	80	100	-	-	-
25	68	80	100	125	80	100	125	-	-	-
30	80	100	125	150	100	125	150	-	-	-
40	104	125	150	200	125	150	200	-	-	-
50	130	175	200	250	175	200	250	-	-	-
60	154	200	225	300	200	225	300	-	-	-
75	192	250	300	350	250	300	350	-	-	-
100	248	300	350	450	300	350	450	-	-	-
125	312	400	450	600	400	450	600	-	-	-
150	360	450	500	600	450	500	600	-	-	-
200	480	600	-	-	600	-	-	-	-	-

Minimum - Fuses are sized near 125% of motor load current. This sizing is not recommended if motor acceleration time exceeds 2 seconds. Minimum sizing will provide close overload relay back-up protection but may not coordinate with some NEMA Class 20 overload relays. Also, for RK1 and J fuses, minimum sizing may not be heavy enough for motors with code letter G or higher.
Typical - Suggested for most applications. Will coordinate with NEMA Class 20 overload relays. Suitable for motor acceleration times up to 5 seconds.
Heavy Load - In accordance with Table 430-152. If this fuse is not sufficient to start the load, it may be increased to a maximum of 225% of full-load amperes (430-52(c) Exc. 2b.) This column should be used for Design E and high efficiency Design B motor fuse sizing.

LOW VOLTAGE FUSES FOR MOTOR PROTECTION (Continued)

Three Phase Motor Fuse Selection UL Classes RK5, RK1 and J

MOTOR HP	FULL LOAD AMPERES	RECOMMENDED FUSE AMPERE RATING — MOTOR ACCELERATION TIMES								
		MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.
380V		RK5–TRS (Tri-onic®)/RK1–A6D			J–AJT			UL Class CC ATDR		
1/2	1.3	1-6/10	2	2-8/10	1-6/10	2	2-8/10	3	4	5-6/10
3/4	1.7	2-1/2	2-8/10	3-1/2	2-1/2	2-8/10	3-1/2	4	6	8
1	2.2	3-2/10	4	4-1/2	3-2/10	4	4-1/2	5	8	10
1-1/2	3.6	4-1/2	5-6/10	7	4-1/2	5-6/10	7	8	12	15
2	4.1	5	6	8	5	6	8	9	15	17-1/2
3	5.8	7	8	12	8	8	12	12	17-1/2	25
5	9.2	12	15	17-1/2	12	15	17-1/2	20	30	-
7-1/2	13.3	15	20	25	17-1/2	20	25	30	-	-
10	17	20	25	30	20	25	30	-	-	-
15	25	30	35	45	30	35	45	-	-	-
20	33	40	45	60	40	50	60	-	-	-
25	41	50	60	75	50	60	75	-	-	-
30	48	60	70	90	60	80	90	-	-	-
40	68	75	90	125	80	100	125	-	-	-
50	79	90	110	150	90	125	150	-	-	-
60	93	110	125	175	110	150	175	-	-	-
75	116	150	175	225	150	175	225	-	-	-
100	150	175	225	300	175	225	300	-	-	-
125	189	250	300	350	250	300	350	-	-	-
150	218	300	350	400	300	350	400	-	-	-
200	291	350	450	600	350	450	600	-	-	-

Minimum - Fuses are sized near 125% of motor load current. This sizing is not recommended if motor acceleration time exceeds 2 seconds. Minimum sizing will provide close overload relay back-up protection but may not coordinate with some NEMA Class 20 overload relays. Also, for RK1 and J fuses, minimum sizing may not be heavy enough for motors with code letter G or higher.
Typical - Suggested for most applications. Will coordinate with NEMA Class 20 overload relays. Suitable for motor acceleration times up to 5 seconds.
Heavy Load - In accordance with Table 2. If this fuse is not sufficient to start the load, it may be increased to a maximum of 225% of full-load amperes This column should be used for Design E and high efficiency Design B motor fuse sizing.

LOW VOLTAGE FUSES FOR MOTOR PROTECTION (Continued)

Three Phase Motor Fuse Selection UL Classes RK5, RK1 and J

MOTOR HP	FULL LOAD AMPERES	RECOMMENDED FUSE AMPERE RATING								
		MOTOR ACCELERATION TIMES								
		MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.
460V		RK5–TRS (Tri-onic®)/RK1–A6D			J–AJT			UL CLASS CC ATDR		
1/2	1.1	1-4/10	1-6/10	2	1-1/2	1-6/10	2	3	3-1/2	4-1/2
3/4	1.6	2	2-1/4	2-8/10	2	2-1/4	2-8/10	3-1/2	5	6-1/4
1	2.1	2-1/2	3-2/10	4	2-1/2	3-2/10	4	5	6-1/4	9
1-1/2	3	3-1/2	4-1/2	5-6/10	3-1/2	4-1/2	5-6/10	6	9	12
2	3.4	4	5	6	4	5	6	8	10	15
3	4.8	5-6/10	7	9	6	8	9	12	15	17-1/2
5	7.6	10	12	15	10	12	15	15	25	30
7-1/2	11	15	17-1/2	20	15	17-1/2	20	25	30	-
10	14	17-1/2	20	25	17-1/2	20	25	30	-	-
15	21	25	30	40	25	30	40	-	-	-
20	27	35	40	50	35	40	50	-	-	-
25	34	40	50	60	40	50	60	-	-	-
30	40	50	60	70	50	60	70	-	-	-
40	52	70	80	100	70	80	100	-	-	-
50	65	80	100	125	80	100	125	-	-	-
60	77	100	125	150	100	125	150	-	-	-
75	96	125	150	175	125	150	175	-	-	-
100	124	175	200	225	175	200	225	-	-	-
125	156	200	225	300	200	225	300	-	-	-
150	180	225	250	350	225	250	350	-	-	-
200	240	300	350	450	300	350	450	-	-	-
250	302	400	450	600	400	450	600	-	-	-
300	361	450	600	-	450	600	-	-	-	-
		CLASS L–A4BT								
300	360	--	601	650						
400	477	--	800	900						
500	590	--	1000	1100						

Minimum - Fuses are sized near 125% of motor load current. This sizing is not recommended if motor acceleration time exceeds 2 seconds. Minimum sizing will provide close overload relay back-up protection but may not coordinate with some NEMA Class 20 overload relays. Also, for RK1 and J fuses, minimum sizing may not be heavy enough for motors with code letter G or higher.
Typical - Suggested for most applications. Will coordinate with NEMA Class 20 overload relays. Suitable for motor acceleration times up to 5 seconds.
Heavy Load - In accordance with Table 2. If this fuse is not sufficient to start the load, it may be increased to a maximum of 225% of full-load amperes This column should be used for Design E and high efficiency Design B motor fuse sizing.

LOW VOLTAGE FUSES FOR MOTOR PROTECTION (Continued)

Three Phase Motor Fuse Selection UL Classes RK5, RK1 and J

MOTOR HP	FULL LOAD AMPERES	RECOMMENDED FUSE AMPERE RATING MOTOR ACCELERATION TIMES								
		MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.	MINIMUM 2 SECS.	TYPICAL 5 SECS.	HEAVY LOAD OVER 5 SECS.
575V		RK5–TRS (Tri-onic®)/RK1–A6D			J–AJT			UL CLASS CC ATDR		
1/2	.9	1-1/8	1-4/10	1-6/10	1-1/4	1-1/2	1-6/10	2-1/2	2-8/10	3-1/2
3/4	1.3	1-6/10	2	2-1/2	1-6/10	2	2-1/2	3	4	5-6/10
1	1.7	2-1/4	2-1/2	3	2-1/4	2-1/2	3	4	5-6/10	6-1/4
1-1/2	2.4	3	3-1/2	4-1/2	3	3-1/2	4-1/2	5	8	10
2	2.7	3-2/10	4	5	3-2/10	4	5	6	8	10
3	3.9	5	6	7	5	6	7	9	12	15
5	6.1	8	9	12	8	10	12	15	17-1/2	25
7-1/2	9	12	15	17-1/2	12	15	17-1/2	20	30	-
10	11	15	17-1/2	20	15	17-1/2	20	25	30	-
15	17	20	25	30	20	25	30	-	-	-
20	22	30	35	40	30	35	40	-	-	-
25	27	35	40	50	35	40	50	-	-	-
30	32	40	50	60	40	50	60	-	-	-
40	41	50	60	75	50	60	75	-	-	-
50	52	70	80	100	70	80	100	-	-	-
60	62	75	90	110	80	90	110	-	-	-
75	77	100	125	150	100	125	150	-	-	-
100	99	125	150	175	125	150	175	-	-	-
125	125	150	175	225	150	200	225	-	-	-
150	144	175	225	300	175	225	300	-	-	-
200	192	250	300	350	250	300	350	-	-	-
250	240	300	350	500	300	350	500	-	-	-
300	289	350	450	600	350	450	600	-	-	-
		CLASS L–A4BT								
400	382	--	601	700						
500	472	--	700	1000						

Minimum - Fuses are sized near 125% of motor load current. This sizing is not recommended if motor acceleration time exceeds 2 seconds. Minimum sizing will provide close overload relay back-up protection but may not coordinate with some NEMA Class 20 overload relays. Also, for RK1 and J fuses, minimum sizing may not be heavy enough for motors with code letter G or higher.
Typical - Suggested for most applications. Will coordinate with NEMA Class 20 overload relays. Suitable for motor acceleration times up to 5 seconds.
Heavy Load - In accordance with Table 2. If this fuse is not sufficient to start the load, it may be increased to a maximum of 225% of full-load amperes This column should be used for Design E and high efficiency Design B motor fuse sizing.

MEDIUM VOLTAGE MOTOR PROTECTION

Fuse Application Guidelines

The guidelines for applying R-rated fuses are significantly different from those applying to low voltage motor fuses. This is because R-rated fuses are special purpose devices which are intended to provide short circuit protection only for medium voltage starters and motors.

An R-rated fuse is not designed to protect itself or other circuit components during long term overloads. This is why these fuses are given an R rating, and not an ampere rating. An R-rated fuse will safely interrupt any current between its minimum interrupting rating and its maximum interrupting rating. The minimum interrupting rating is verified during UL tests for UL component recognition.

R-rated fuses must be applied in combination with an overload relay and a contactor. The time current characteristics of the fuse and overload relay should be matched so that the contactor interrupts currents below the fuse's minimum interrupting rating while the fuse interrupts fault currents, thus easing duty on the contactor and extending the interrupting ability of the controller.

A medium voltage starter is usually engineered for a specific motor and application. For this reason the starter manufacturer generally selects the proper fuse R rating and provides the fuses as part of the starter package. Unless the user has good reason, no deviation should be made from the R rating recommended by the starter manufacturer. If the user has an existing starter which is to be applied to a new or different motor, the application should be reviewed with the starter manufacturer. Recalibration of the overload relay(s) or fuses of a different R rating may be required.

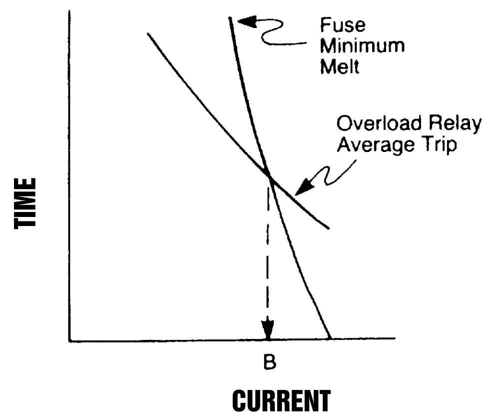
Properly sized R-rated fuses should provide a service life approaching that of the contactor. If fuse openings are experienced with no faults present, the fuses, overload relay or both may be improperly sized. The table in this section is offered as a guideline and shows the maximum motor full load current appropriate for a given R rating. In addition to this table it is advisable to compare the fuse minimum melt time-current curve and the nominal time-current characteristic curve for the overload relay. These curves should intersect at (B) no less than 120% of motor locked rotor current (see figure). This will assure that the contactor will open before the fuse during locked rotor conditions.

The 10 or 3 Second Start

The 10 or 3 Second Start listed in the table is a start during which the motor accelerates from standstill to rated speed in 10 (or 3) seconds or less. For reduced voltage starting, motor starting current should not exceed 75% of the fuse minimum melt current for the required motor acceleration time.

Consult the factory for application assistance for ratings above 36R.

Fuse/Overload Relay Crossover Point



where B □ 1.2 x locked rotor amperes

Motor Full Load Currents for R-Rated Fuses*

FUSE R RATING	MAX. MOTOR FULL-LOAD CURRENT FOR FULL VOLTAGE START - AMPERES	
	10 sec. start	3 sec. start
2R	28	32
3R	40	45
4R	55	65
6R	80	95
9R	125	140
12R	165	190
18R	250	280
24R	330	360
36R	500	550

*Note: Always round up to the next larger R rating.

TRANSFORMER PROTECTION

The National Electrical Code and the Canadian Electrical Code cover overcurrent protection of transformers. Some of the requirements in this article are summarized here.

Transformers - Primary 600 Volts or Less

If secondary fuse protection is not provided, primary fuses are to be selected according to Table 1. If both primary and secondary fuses are used, they are to be selected according to Table 2.

Table 1- Primary Fuse Only

TRANSFORMER PRIMARY AMPERES	MAXIMUM PRIMARY FUSE % RATING
9 or more	125*
2 to less than 9	167
less than 2	300

Table 2- Primary & Secondary Fuses

TRANSFORMER SECONDARY AMPERES	MAXIMUM % RATING	
	PRIMARY FUSE	SECONDARY FUSE
9 or more	250	125*
less than 9	250	167

* If 125% does not correspond to a standard ampere rating, the next higher standard rating shall be permitted.

Transformer Magnetizing Inrush Currents

When voltage is switched on to energize a transformer, the transformer core normally saturates. This results in a large inrush current which is greatest during the first half cycle (approximately .01 second) and becomes progressively less severe over the next several cycles (approximately .1 second) until the transformer reaches its normal magnetizing current.

To accommodate this inrush current, fuses are often selected which have time-current withstand values of at least 12 times transformer primary rated current for .1 second and 25 times for .01 second. Recommended primary fuses for popular, low-voltage 3-phase transformers are shown on the next page. Some small dry-type transformers may have substantially greater inrush currents. For these applications, the fuse may have to be selected to withstand 45 times transformer primary rated current for .01 second.

Secondary Fuses

Selecting fuses for the secondary is simple once rated secondary current is known. Fuses are sized at 125% secondary FLA or next higher rating or at maximum 167% of secondary FLA depending on secondary current. The preferred sizing is 125% of rated secondary current Isec) or next higher fuse rating. To determine Isec, first determine transformer rating (VA or kVA), secondary voltage (Vsec) and whether it is single or 3 phase.

1. Single Phase : $I_{sec} = \frac{\text{Transformer VA}}{V_{sec}}$ or $\frac{\text{Transformer kVA} \times 1000}{V_{sec}}$

2. Three Phase : $I_{sec} = \frac{\text{Transformer VA}}{1.73 \times V_{sec}}$ or $\frac{\text{Transformer kVA} \times 1000}{1.73 \times V_{sec}}$

When Isec is determined, multiply it by 1.25 and choose that fuse rating or next higher rating. [Isec x 1.25 = Fuse Rating]

Transformers - Primary Over 600 Volts

If In unsupervised locations, fuses are to be selected according to Table 3. Where the required fuse rating does not correspond to a standard ampere rating, the next higher standard rating shall be permitted. In supervised locations,fuses are to be selected according to Table 4.

Table 3- Unsupervised Locations

TRANSFORMER RATED % IMPEDANCE	MAXIMUM % RATING		
	PRIMARY FUSE	SECONDARY FUSE	
		OVER 600V	600V or LESS
6 or less	300	250	125
More than 6 & not more than 10	300	225	125

Table 4- Supervised Locations

TRANSFORMER RATED % IMPEDANCE	MAXIMUM % RATING		
	PRIMARY FUSE	SECONDARY FUSE	
		OVER 600V	600V or LESS
All	250**	-	-
6 or less	300	250	250
More than 6 & not more than 10	300	225	250

** Where only primary fuses are used and where 250% does not correspond to a standard ampere rating, the next higher standard rating shall be permitted.

PRIMARY FUSES FOR THREE PHASE LOW VOLTAGE TRANSFORMERS

Recommended Primary Fuses for 240 Volt, Three Phase Transformers

TRANSFORMER RATING KVA	240 VOLT PRIMARY					
	PRIMARY FULL LOAD AMPS	PRIMARY FUSE RATING				
		TR-R	AJT* or A2D-R*	A4BT*	A4BY*	A4BQ*
3	7.2	9	15	-	-	-
5	12	15	25	-	-	-
7-1/2	18	25	40	-	-	-
9	22	30	45	-	-	-
15	36	45	60	-	-	-
30	72	90	150	-	-	-
45	108	150	225	-	-	-
75	180	225	400	-	-	-
100	241	300	450	-	-	-
112-1/2	271	350	500	-	-	-
150	361	450	600	-	-	-
225	541	600	-	800	900	1200
300	722	-	-	1200	1200	1600
500	1203	-	-	1800	2000	2500
750	1804	-	-	-	3000	4000
1000	2406	-	-	-	5000	5000
1500	3608	-	-	-	6000	-

Recommended Primary Fuses for 480 & 600 Volt, Three Phase Transformers

TRANSFORMER RATING KVA	480 VOLT PRIMARY						600 VOLT PRIMARY					
	PRIMARY FULL LOAD AMPS	PRIMARY FUSE RATING					PRIMARY FULL LOAD AMPS	PRIMARY FUSE RATING				
		TRS-R	AJT* or A6D-R*	A4BT*	A4BY*	A4BQ*		TRS-R	AJT* or A6D-R*	A4BT*	A4BY*	A4BQ*
3	3.6	4-1/2	6	-	-	-	2.9	4	5	-	-	-
5	6.0	8	12	-	-	-	4.8	6	10	-	-	-
7-1/2	9.0	12	15	-	-	-	7.2	9	15	-	-	-
9	11	15	25	-	-	-	9.0	12	17-1/2	-	-	-
15	18	25	35	-	-	-	14	20	25	-	-	-
30	36	45	60	-	-	-	29	35	45	-	-	-
45	54	70	100	-	-	-	43	60	80	-	-	-
75	90	125	175	-	-	-	72	90	150	-	-	-
100	120	150	225	-	-	-	96	125	200	-	-	-
112-1/2	135	175	300	-	-	-	108	150	225	-	-	-
150	180	225	400	-	-	-	144	200	300	-	-	-
225	271	350	500	-	-	-	217	300	450	-	-	-
300	361	450	600	-	-	-	289	350	500	-	-	-
500	601	-	-	1000	1000	1200	481	600	-	700	900	1000
750	902	-	-	1400	1600	2000	722	-	-	1200	1400	1600
1000	1203	-	-	1800	2000	2500	962	-	-	1600	1800	2000
1500	1804	-	-	-	3000	4000	1443	-	-	2000	2500	3000
2000	2406	-	-	-	4000	5000	1925	-	-	-	4000	4000
2500	3007	-	-	-	5000	6000	2406	-	-	-	5000	5000

*When using these fuses, the secondary of the transformer must be fused to comply with the Code.

E-RATED PRIMARY FUSES FOR THREE PHASE POWER TRANSFORMERS

Primary Fuse Ratings - 2400, 4160, 4800 Volts

TRANSFORMER RATING KVA[2]	PRIMARY FUSE RATING[1]								
	2400V (A055)			4160V (A055)			4800V (A055)		
	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%
112-1/2	27	30E	40E	16	20E	20E	14	20E	20E
150	36	40E	50E	21	25E	30E	18	20E	25E
225	54	65E	80E	31	40E	40E	27	30E	40E
300	72	80E	100E	42	50E	65E	36	40E	50E
500	120	125E	200E	69	80E	100E	60	65E	80E
750	180	200E	250E	104	125E	150E	90	100E	125E
1000	241	250E	400E	139	150E	200E	120	125E	200E
1500	361	400E	500E	208	250E	300E	180	200E	250E
2000	482	600E	-	278	300E	400E	241	250E	400E
2500	602	-	-	348	400E	500E	301	350E	400E
3000	722	-	-	416	450E	600E	361	400E	500E
3750	902	-	-	520	600E	750E	451	500E	600E
5000	1203	-	-	694	750E	-	601	750E	900E

Primary Fuse Ratings - 6900, 7200, 8320 Volts

TRANSFORMER RATING KVA[2]	PRIMARY FUSE RATING[1]								
	6900V* (A825X)*			7200V* (A825X)*			8320 (A155)		
	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%
112-1/2	9	-	-	9	-	-	7.8	10E	10E
150	12	-	20E	12	-	20E	10.4	15E	15E
225	19	25E	25E	18	20E	25E	15.6	20E	20E
300	25	30E	40E	24	30E	40E	20.8	25E	30E
500	42	50E	65E	40	50E	65E	34.7	40E	50E
750	63	80E	100E	60	65E	80E	52	65E	80E
1000	84	100E	125E	80	100E	125E	69.4	80E	100E
1500	126	150E	200E	120	125E	200E	104	125E	150E
2000	167	200E	-	160	200E	200E	139	150E	200E
2500	209	-	-	201	-	-	173	200E	-
3000	251	-	-	241	-	-	208	-	-

[1] Minimum fuse size shown will carry transformer magnetizing inrush current of 12 times full load amperes for .1 second.
133% fuse size permits continuous operation of transformer at 133% of its self cooled KVA rating.

[2] The self-cooled rating of the transformer. (If a forced-air cooled KVA rating is given, use that rating to size the fuse and be sure the fuse will carry the higher load current.)
* Consult factory for technical information.

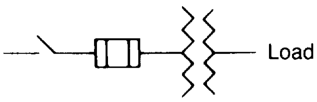
Recommended Fuses

Ferraz Shawmut CS-3: 5KV-A055F, 8KV-A825X*, 15KV-A155F, CL-14: 5KV-A055C, A055B, 15KV-A155C

Examples:

1. A new installation has a 300KVA transformer with 4160V primary. It is not fully loaded. What is minimum size primary fuse recommended?

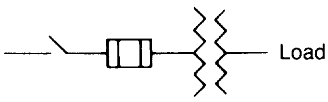
4160V Source



A 50E rating (Ferraz Shawmut A055F1DORO-50E or equivalent) is correct. Lower ratings may open when transformer is energized.

2. What is the normal fuse size recommended for a 1000KVA transformer with 8320V primary?

8320V Source



Unless special conditions are noted, the 133% primary fuse rating is correct. For this application use a 100E rating A155F2DORO-100E or equivalent which will allow normal overload operations of transformer up to 133% of rating.

AMP-TRAP 2000

E-RATED PRIMARY FUSES FOR THREE PHASE POWER TRANSFORMERS (Continued)

Primary Fuse Ratings - 12,000, 12,470, 13,200 Volts

TRANSFORMER RATING KVA[2]	PRIMARY FUSE RATING[1]								
	12,000V (A155)			12,470V (A155)			13,200V (A155)		
	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%
112-1/2	5.4	10E	10E	5.2	10E	10E	4.9	10E	10E
150	7.0	10E	10E	7.0	10E	10E	6.6	10E	10E
225	10.8	15E	15E	10.4	15E	15E	9.8	15E	15E
300	14.4	20E	20E	14	15E	20E	13	15E	20E
500	24	30E	40E	23	25E	30E	22	25E	30E
750	36	40E	50E	35	40E	50E	33	40E	50E
1000	48	65E	65E	46	50E	65E	44	50E	65E
1500	72	80E	100E	70	80E	100E	66	80E	100E
2000	96	125E	150E	92	100E	125E	88	100E	125E
2500	120	125E	200E	116	125E	200E	109	125E	150E
3000	144	150E	200E	139	150E	200E	131	150E	200E

Primary Fuse Ratings -13,800, 14,400 Volts

TRANSFORMER RATING KVA[2]	PRIMARY FUSE RATING[1]					
	13,800V (A155)			14,400V (A155)		
	FULL LOAD AMPERES	MIN.	133%	FULL LOAD AMPERES	MIN.	133%
112-1/2	4.7	10E	10E	4.5	10E	10E
150	6.2	10E	10E	6.0	10E	10E
225	9.4	15E	15E	9.0	10E	15E
300	12.6	15E	20E	12	15E	20E
500	21	25E	30E	20	25E	30E
750	32	40E	50E	30	40E	40E
1000	42	50E	65E	40	50E	65E
1500	63	80E	100E	60	65E	80E
2000	84	100E	125E	80	100E	125E
2500	105	125E	150E	100	125E	150E
3000	125	150E	200E	120	150E	200E

1 Minimum fuse size shown will carry transformer magnetizing inrush current of 12 times full load amperes for .1 second.
133% fuse size permits continuous operation of transformer at 133% of its self cooled KVA rating.

2 The self-cooled rating of the transformer. (If a forced-air cooled KVA rating is given, use that rating to size the fuse and be sure the fuse will carry the higher load current.)

Recommended Fuses

Ferraz Shawmut CS-3: 5KV-A055F, 15KV-A155F, CL-14: 5KV-A055C, A055B, 15KV-A155C

Maximum Fuse Size

The Code allows primary fuses to be sized up to 250% of transformer primary current rating. Sizing this large may not provide adequate protection. Maximum fuse size should determined by making sure the fuse total clearing curve does not exceed transformer damage curve. The transformer manufacturer should be consulted to determine transformer overload and short circuit withstand capability.

CONTROL CIRCUIT TRANSFORMERS

Control circuit transformers used as part of a motor control circuit are to be protected as outlined in Tables 1 & 2 (p. AP13) with one important exception. Primary fuses may be sized up to 500% of transformer rated primary current if the rated primary current is less than 2 amperes.

When a control circuit transformer is energized,the typical magnetizing inrush will be 25-40 times rated primary full load current (FLA) for the first 1/2 cycle and dissipates to rated current in a few cycles. Fuses must be sized so they do not open during this inrush. We recommend that fuses be selected to withstand 40 x FLA for .01 sec. and to stay within the NEC guidelines specified above.

For example: 300VA Transformer, 600 V primary.

$$I_{pri} = \frac{\text{Transformer VA}}{\text{Primary V}} = \frac{300}{600} = 1/2A = FLA$$

The fuse time-current curve must lie to the right to the point 40 x (1/2A) = 20A @ .01 sec.

Recommended Primary Fuses for Single Phase Control Transformers

TRANS VA	600 VOLT PRIMARY						480 VOLT PRIMARY					
	FLA	ATQR	ATMR	A6D-R+	AJT+	TRS-R	FLA	ATQR	ATMR	A6D-R+	AJT+	TRS-R
25	.042	1/10	2/10	2/10	-	1/10	.052	1/10	1/4	1/4	-	1/10
50	.083	1/4	3/10*	4/10	-	2/10	.104	1/4	1/2*	1/2	-	2/10
75	.125	1/4	1/2*	6/10	-	2/10	.156	3/10	3/4*	6/10	-	2/10
100	.167	3/10	3/4*	8/10	-	3/10	.208	4/10	1	1	1	3/10
130	.22	4/10	1	1-1/4	1-1/4	4/10	.27	1/2	1	1-4/10	1-1/2	4/10
150	.25	1/2	1*	1-1/4	1	4/10	.313	1/2	1-1/2	1-4/10	1-1/2	4/10
200	.33	1/2	1-1/2	1-6/10	1-1/2	6/10	.417	6/10	2	2	2	6/10
250	.42	6/10	2	2	2	6/10	.52	8/10	2	2-1/2	2-1/2	6/10
300	.50	1	2	2-1/2	2	8/10	.62	1-1/2	3	3	3	8/10
350	.583	1-1/4	2	2-8/10	2	1	.73	1-1/2	3-1/2	3-1/2	3-1/2	1
500	.833	1-1/2	4	4	4	1-1/4	1.04	2	5	4	4	1-4/10
750	1.25	2-1/2	6	4	4	1-6/10	I.56	3	7	5	5	2
1000	1.67	3	8	5	5	2-1/4	2.08	4+	-	5	5	3
1500	2.5	5+	-	6	6	4	3.125	7+	-	6-1/4	6-1/4	4
2000	3.33	8+	-	8	8	5	4.17	10+	-	7	7	5
3000	5.00	12+	-	12	12*	8	6.25	15+*	-	15*	15	8
5000	8.33	20+	-	20*	20**	12	10.4	25+**	-	25*	25*	15
7500	12.5	30+	-	30*	30*	17-1/2	15.6	-	-	35**	35**	20
10000	16.7	-	-	40*	40*	25	20.8	-	-	50**	50**	30
	240 VOLT PRIMARY						**120 VOLT PRIMARY**					
25	.104	2/10	1/2	1/2	-	2/10	.21	4/10	1	1	1	3/10
50	.21	4/10	1	1	1	3/10	.42	6/10	2	2	2	6/10
75	.31	1/2	1-1/2	1-4/10	1-1/2	4/10	.6	1	3	3	3	8/10
100	.42	6/10	2	2	2	6/10	.83	1-1/2	4	4	4	1
130	.54	1	2-1/2	2-1/2	2-1/2	8/10	1.08	2-1/2	5	4	4	1-6/10
150	.625	1	3	3	3	8/10	1.25	2-1/2	6	4	4	1-6/10
200	.83	1-1/2	4	3-1/2	3-1/2	1	1.67	3+	8	5	5	2-1/4
250	1.04	2	5	4	4	1-4/10	2.08	4+	-	5	5	2-8/10
300	1.25	2-1/2	6	4	4	1-6/10	2.5	5+	-	6	6	3-2/10
350	1.46	3	7	5	5	2	2.92	7+	-	6	6	4
500	2.08	4+	-	5	5	2-8/10	4.17	10+	-	10	6	5.6
750	3.13	7+	-	6-1/4	6-1/4	4	6.25	15+	-	15**	15	8
1000	4.2	10+	-	7	7	5-6/10	8.33	20+	-	20**	20*	12
1500	6.25	15+		15	15	8	12.5	30+	-	30	30	15
2000	8.3	20+	-	20**	20**	12	16.7	-	-	40**	40	25
3000	12.5	30+	-	30**	30**	15	25	-	-	60**	60*	35
5000	20.8	-	-	50**	50*	25	41.7	-	-	100**	100**	60
7500	31.3	-	-	70**	70**	40	62.5	-	-	150**	150**	90
10000	41.7	-	-	100**	100**	60	83.3	-	-	200**	200**	125

The above fuses will withstand 40 x FLA for .01 second except where noted.

+ Secondary fusing required. * Fuse will withstand 30 x FLA for .01 second. ** Fuse will withstand 35 x FLA for .01 second.

SEMICONDUCTOR PROTECTION

Solid State devices have progressed through several generations of sophistication since their introduction in the 1940s. Fuse designs have changed to match solid state protection demands.

The protection task looks simple- choose a fuse of correct voltage and ampere rating which will protect a solid state device (diode, silicon-controlled rectifier, triac, etc.) through a wide range of overcurrents, yet carry normal rated loads without deterioration through a long life.

Solid state power devices operate at high current densities. Cooling is a prime consideration. The fuse should be cooled with the solid state device. Cycling conditions must be considered. The ability of solid state devices to switch high currents at high speed subjects fuses to thermal and mechanical stresses. Proper fuse selection is mandatory for long-term reliability.

Solid state devices have relatively short thermal time constants. An overcurrent which may not harm an electro-mechanical device can cause catastrophic failure of a solid state device.

Many solid state devices have an overcurrent withstand rating which is termed "I^2t for fusing". These values are found in most power semiconductor application handbooks.

Fuses intended for solid state device protection are rated in terms of total clearing I^2t.. Fuses and devices are matched so that the total clearing I^2t of the fuse is less than the withstand I^2t for the device.

The published fuse total clearing I^2t values are derived from short-circuit test oscillograms of the fuse under controlled conditions. The end application can vary significantly from the tested conditions. The specifier must take these differences into account since they will affect fuse clearing I^2t.

For application guidelines, request the Ferraz Shawmut publication titled *Power Semiconductor Fuse Application Guide*, and the software program *Power Semiconductor Protection Solutions*.

DC CIRCUIT PROTECTION

AC applications are more common than DC. this is why fuses are generally designed, tested and rated for AC. Fuses rated for AC are also capable to DC circuit interruption. The key question is how much DC voltage interrupting capability does an AC rated fuse have? There is no safe rule of thumb that will convert AC voltage rating to a DC voltage rating. Testing is required to determine the DC voltage rating of a fuse, and Technical Services must be consulted.

DC Circuit Parameters

The degree of difficulty of interrupting a DC circuit is a function of the voltage, current and circuit time constant. The higher the voltage and time constant, the more difficult the interruption is for the fuse.

Time constant is defined as **t = L/R** where:

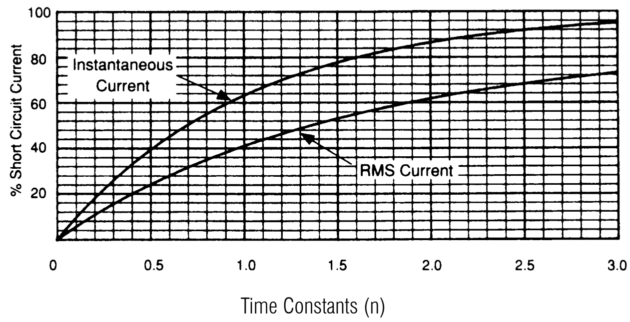
- **t** is time constant in seconds
- **L** is inductance in henrys
- **R** is resistance in ohms

If rated voltage is applied, 63% of rated current will be reached in one time constant.

DC Short Circuit

Graph A shows the relationship of current as a function of time during a DC short circuit.

Graph A- Current as a Function of Time During a DC Short Circuit



Instantaneous Current (I inst) = $I_{sc}\,[1 - e^{-n}]$

RMS Current (I rms) = $I_{sc}\sqrt{1 + \frac{2e^{-n}}{n} - \frac{e^{-2n}}{2n} - \frac{1.5}{n}}$

Where Isc = short circuit current, n = number of time constants

Let's consider an example.

Given: Voltage = 600VDC
Circuit Resistance (R) = 0.1 ohm
Circuit Inductance (L) = 1.0 x 10-3 henry

$$I_{sc} = \frac{600\text{ Volts}}{0.1\text{ ohm}} = 6000\text{ Amperes}$$

$$t\ (\text{time constant}) = L/R = \frac{1.0 \times 10^{-3}\text{ henry}}{0.1\text{ ohm}} = .01\text{ second}$$

In the example, if a short circuit occurs, the instantaneous current will rise to .63 x 6000 = 3780 amperes in .01 second (one time constant). In .05 second (5 time constants) the short-circuit current will reach its ultimate value of 6000 amperes.

DC CIRCUIT PROTECTION (Continued)

Typical Time Constants

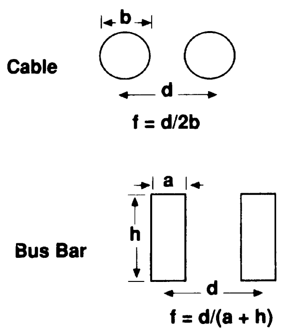
The time constant of a circuit is a function of the resistance and inductance of the components in the circuit. Here are typical time constants associated with the different DC voltage sources:

Less than 10 milliseconds	Battery supply of capacitor bank
Less than 25 milliseconds	Bridge circuit
10 to 40 milliseconds	Armature circuit of DC motor
1 second*	Field winding of DC motor

* Where time constants exceed 100 milliseconds, we do not recommend the use of fuses. A fuse can be used to interrupt short circuits in these cases, but only under conditions where the inductance (load) is effectively by-passed.

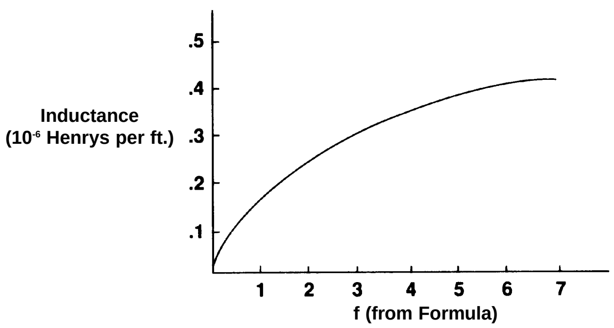
Maximum parallel conductor inductance can be assumed to be less than .5 x 10^{-6} henry per foot of conductor. Graph B approximates conductor inductance based on conductor size and spacing.

Conductor End Views



Third

Graph B- Conductor Inductance



Party Approval/Listing

Underwriters Laboratories and the Mine Safety and Health Administration (MSHA) are third party organizations which test and list or approve fuses for DC application, respectively.

Two UL standards exist for the DC rating of fuses. UL198L, entitled *DC Fuses for Industrial Use* which provides for DC rating of UL class fuses for industrial use in accordance with the Code. UL 198M, entitled *Mine-Duty Fuses* addresses the DC rating of Class R and Class K fuses intended for the short circuit protection of trailing cables in mines. UL198M is equivalent to the requirements of MSHA, which are administered by the United States Department of Labor. The MSHA requirements for approval of DC rated fuses are specified in the Code of Federal Regulations, Title 30, Part 28.

Table 1 shows the voltage ratings and time constants associated with these standards.

Ferraz Shawmut fuses which have been tested and rated for DC by third party certification agencies are shown in Table 2 and Table 3. The Ferraz Shawmut Applications Engineering Department should be contacted for assistance with applications not served by these products.

Table 1- DC Parameters of UL and MSHA Standards

STANDARD	VOLTAGE	TIME CONSTANT	TEST CURRENT
UL198L	60, 125, 160 250, 300, 400 500, 600V DC	.01 second or $t = {}^{1}/_{2}(I)^{0.3}$	10kA or higher Less than 10kA
MSHA & UL198M	300 or 600V DC	.016 second .008 second .006 second .002 second	10kA or higher 1kA to 9.99kA 100A to 999A Less than 100A

Table 2- DC Ratings of General Purpose Shawmut Fuses

FUSE	FUSE AMPERE RATING	DC VOLTAGE	INTERRUPTING RATING	LISTING OR APPROVAL
ATM	0 to 30A	500V	100kA	UL198L
TRS-RDC	35 to 400A	600V	20kA	MSHA
A4BQ	601 to 3000A	500V	100kA	UL198L
TRS-R	0 to 12A	600V	20kA	UL198L
TRS-R	15 to 60A	300V	20kA	UL198L
TRS-R	70 to 600A	600V	100kA	UL198L
AJT	1 TO 600	500V	100kA	UL 198L
A3T	1 to 1200	160V	50kA	UL 198L
A6T	1 TO 800	300V	100kA	UL198L
ATDR	1/4 TO 30	300V	100KA	UL198L

Table 3-DC Voltage Ratings of Component Recognized Shawmut Fuses*

CATALOG NUMBER	FUSE AMPERE RATING	DC VOLTAGE	INTERRUPTING RATING
A13X	70 TO 2000A	100V	10kA
A50P	35 TO 800 A	450V	79kA
A50QS	70 TO 600A	500V	87kA
A70P	10 TO 800A	650V	100kA
A70Q	35 TO 600A	650V	100kA
A2Y Type 1	1 TO 60A	500V	100kA
A2Y Type 3	70 TO 600A	500V	100kA
A5Y, A6Y Types 1, 11	1 to 60A	500V	100kA
A5Y, A6Y, Types 3, 21	70 TO 600A	500V	100kA
A60Q	5-40A	600V	100KA
A70QS	35-800	700V	100KA

*UL Recognized Components complying with UL198L DC requirements.

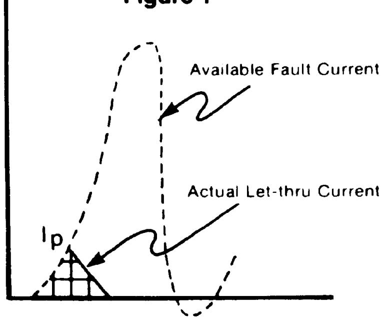
LET-THRU CURRENT AND I^2t

Current limitation is one of the important benefits provided by modern fuses. Current-limiting fuses are capable of isolating a faulted circuit before the fault current has sufficient time to reach its maximum value. This current-limiting action provides several benefits:

- It limits thermal and mechanical stresses created by the fault currents.
- It reduces the magnitude and duration of the system voltage drop caused by fault currents.
- Current-limiting fuses can be precisely and easily coordinated under even short circuit conditions to minimize unnecessary service interruption.

Peak let-thru current (Ip) and I^2t are two measures of the degree of current limitation provided by a fuse. Maximum allowable Ip and I^2t values are specified in UL standards for all UL listed current-limiting fuses, and are available on all semiconductor fuses.

Figure 1



Let-Thru Current

Let-thru current is that current passed by a fuse while the fuse is interrupting a fault within the fuse's current-limiting range. Figure 1 illustrates this. Let-thru current is expressed as a peak instantaneous value (Ip).

Ip

Ip data is generally presented in the form of a graph. Let's review the key information provided by a peak let-thru graph. Figure 2 shows the important components.

(1) The X-axis is labeled "Available Fault Current" in RMS symmetrical amperes.

(2) The Y-axis is labeled as "Instantaneous Peak Let-Thru Current" in amperes.

(3) The line labeled "Maximum Peak Current Circuit Can Produce" gives the worst case peak current possible with no fuse in the circuit.

(4) the fuse characteristic line is a plot of the peak let-thru currents which are passed by a given fuse at various available fault currents.

Figure 2

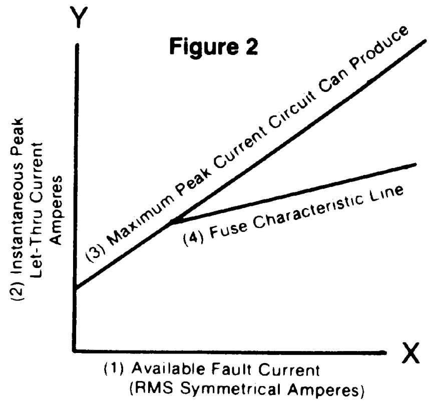
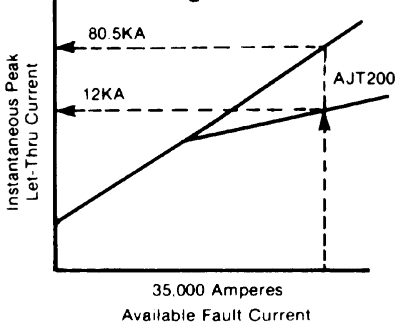


Figure 3 illustrates the use of the peak let-thru current graph. Assume that a 200 ampere Class J fuse (#AJT200) is to be applied where the available fault current is 35,000 amperes RMS. The graph shows that with 35,000 amperes RMS available, the peak available current is 80,500 amperes (35,000 x 2.3) and that the fuse will limit the peak let-thru current to 12,000 amperes.

You may wonder why the peak available current is 2.3 times greater than the RMS available current. In theory the peak available fault current can be anywhere from 1.414 x (RMS available) to 2.828 x (RMS available) in a circuit where the impedance is all reactance with no resistance. In reality all circuits include some resistance and the 2.3 multiplier has been chosen as a practical limit. This subject is discussed in depth in the Ferraz Shawmut publication "*You Too Can Be A Short-Circuit Expert*".

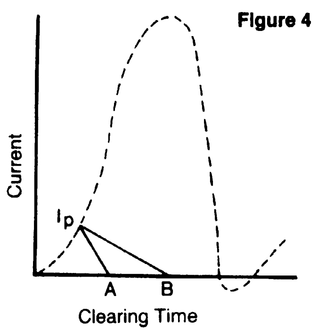
Figure 3



LET-THRU CURRENT AND I^2t (Continued)

Ip versus I^2t

Ip has a rather limited application usefulness. Two fuses can have the same Ip but different total clearing times. See Figure 4.



The fuse that clears in time A will provide better component protection than will the fuse that clears in time B.

Fuse clearing I^2t takes into account Ip and total clearing time. Fuse clearing I^2t values are derived from oscillograms of fuses tested within their current-limiting range and are calculated as follows:

$$I^2t = \int_0^t I^2 dt$$

The "t" in the equation is the total clearing time for the fuse. To be proper, I^2t should be written as $(I_{RMS})^2t$. It is generally understood that the "I" in I^2t is really I_{RMS}, and the RMS is dropped for the sake of brevity.

Note, from Figure 4, since clearing time "B" is approximately twice clearing time "A", the resultant I^2t for that fuse will be at least twice the I^2t for the fuse with clearing time "A" and its level of protection will be correspondingly lower.

The I^2t passed by a given fuse is dependent upon the characteristics of the fuse and upon the applied voltage. The I^2t passed by a given fuse will decrease as the application voltage decreases. Unless stated otherwise, published I^2t values are based on AC testing. The I^2t passed by a fuse in a DC application may be higher or lower than in an AC application. The voltage, available fault current and time constant of the DC circuit are the determining factors.

Fuse I^2t value can be used to determine the level of protection provided to circuit components under fault current conditions. Manufacturers of diodes, thyristors, triacs, and cable publish I^2t withstand ratings for their products. The fuse chosen to protect these products should have a clearing I^2t that is lower than the withstand I^2t of the device being protected.

FUSE LET-THRU TABLES

Apparent RMS Symmetrical Let-Thru Current

Although the current-limiting characteristics of current-limiting fuses are represented in Peak Let-Thru **charts**, an increasingly easy to use method of presenting this data uses Peak Let-Thru **tables**. The tables are based on Peak Let-Thru charts and reflect fuse tests at 15% power factor at rated voltage with prospective fault currents as high as 200,000 amperes. At each prospective fault current, let-thru data is given in two forms for an individual fuse - Irms and Ip. Where Irms is the "Apparent RMS Symmetrical Current" and Ip is the maximum peak instantaneous current passed by the fuse, the Ip let-thru current is 2.3 times Irms. This relationship exists between peak current and RMS available current under worst-case test conditions (i.e. closing angle of 0^0 at 15% power factor).

Let-thru tables are easier to read than let-thru charts. Presenting let-thru data in table versus chart format reduces the possibility of misreading the information and saves time. These tables are also helpful when comparing the current-limiting capability of various fuses.

FUSE LET-THRU TABLES

Table 1- Class L, A4BQ Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES																					
	601		800		1000		1200		1600		2000		2500		3000		4000		5000		6000	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	Irms	Ip	Irms	Ip
10,000	7.4	17	8.7	20	10	23	10	23	10	23	10	23	10	23	10	23	10	23	10	23	10	23
15,000	8.3	19	10	23	12	27	13	30	15	35	15	35	15	35	15	35	15	35	15	35	15	35
20,000	9.1	21	11	25	13	29	14	33	17	39	20	46	20	46	20	46	20	46	20	46	20	46
25,000	9.8	23	12	27	13	31	15	35	18	42	22	50	25	58	25	58	25	58	25	58	25	58
30,000	10	24	13	29	14	33	16	37	20	45	23	53	29	66	30	69	30	69	30	69	30	69
35,000	11	25	13	30	15	35	17	39	20	47	24	56	30	69	35	81	35	81	35	81	35	81
40,000	12	27	14	32	16	37	18	41	21	49	25	58	31	72	36	83	40	92	40	92	40	92
50,000	13	29	15	34	17	40	19	44	23	53	27	63	34	78	39	89	48	111	50	115	50	115
60,000	13	30	16	36	18	42	20	47	25	57	29	67	36	83	41	94	51	118	60	138	60	138
80,000	14	33	17	40	20	46	23	52	27	62	32	73	40	91	45	104	57	130	67	153	77	176
100,000	16	36	19	43	22	50	24	56	29	67	34	79	43	98	49	112	61	140	72	165	83	190
150,000	18	41	21	49	25	57	28	64	33	77	39	90	49	112	56	128	70	160	82	189	94	217
200,000	20	45	24	54	27	63	31	71	37	84	43	100	53	123	61	141	77	176	90	208	104	239

Table 2 - Class L, A4BY Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES																	
	601		800		1000		1200		1600		2000		2500		3000		4000	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
15,000	11	24	13	29	15	35	15	35	15	35	15	35	15	35	15	35	15	35
20,000	12	26	14	32	16	37	19	43	20	46	20	46	20	46	20	46	20	46
25,000	13	29	15	34	18	40	20	46	24	55	25	58	25	58	25	58	25	58
30,000	13	30	16	36	19	43	21	49	25	58	29	67	30	69	30	69	30	69
35,000	14	32	17	38	20	45	23	52	27	61	30	70	33	76	35	81	35	81
40,000	15	34	17	40	21	47	24	54	28	64	32	73	35	79	37	86	40	92
50,000	16	36	19	43	22	51	25	58	30	68	34	78	37	86	41	95	50	115
60,000	17	38	20	45	24	54	27	62	31	72	37	84	40	91	44	100	53	121
80,000	18	42	22	50	26	59	29	67	35	80	40	92	44	100	48	110	58	133
100,000	20	45	24	54	28	64	32	73	38	87	43	99	47	108	52	119	62	143
150,000	23	52	27	62	32	73	37	84	43	99	49	113	54	123	59	137	73	167
200,000	25	56	29	67	35	80	40	91	48	110	54	123	59	136	65	150	79	181

Table 3 - Class L, A4BT Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES									
	800		1000		1200		1600		2000	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
15,000	14	33	15	35	15	35	15	35	15	35
20,000	16	36	18	41	20	46	20	46	20	46
25,000	17	39	19	45	22	50	25	58	25	58
30,000	18	41	21	48	23	54	28	63	30	69
35,000	19	43	22	50	25	56	29	67	34	79
40,000	20	45	23	52	26	59	30	70	35	81
50,000	21	49	25	56	28	63	33	75	38	87
60,000	23	52	26	60	29	67	35	80	40	93
80,000	25	57	29	66	32	74	38	88	44	102
100,000	27	62	31	71	35	80	41	95	48	110
150,000	31	70	35	81	40	92	47	109	55	126
200,000	34	78	39	89	44	101	52	120	60	139

FUSE LET-THRU TABLES (Continued)

Apparent RMS Symmetrical Let-Thru Current

Table 4 - Class RK1, A6K Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.63	1.4	1.4	3.2	2.0	4.6	3.2	7.4	4.6	11	5.0	11.5
10,000	.80	1.8	1.7	3.9	2.6	6.0	4.0	9.2	5.8	13	7.5	17
15,000	.91	2.1	2.0	4.6	2.9	6.7	4.6	11	6.7	15	8.6	20
20,000	1.0	2.3	2.2	5.1	3.2	7.4	5.0	12	7.4	17	9.5	22
25,000	1.1	2.5	2.4	5.5	3.5	8.1	5.4	12	7.9	18	10	23
30,000	1.2	2.6	2.5	5.8	3.7	8.5	5.8	13	8.4	19	11	25
35,000	1.2	2.8	2.6	6.0	3.9	9.0	6.1	14	8.9	20	11	26
40,000	1.3	2.9	2.8	6.4	4.1	9.4	6.3	14	9.3	21	12	27
50,000	1.4	3.1	3.0	6.9	4.4	10	6.8	16	10	23	13	30
60,000	1.4	3.3	3.2	7.4	4.7	11	7.3	17	11	24	14	32
80,000	1.6	3.7	3.5	8.1	5.1	12	8.0	18	12	27	15	35
100,000	1.7	3.9	3.7	8.5	5.5	13	8.6	20	13	29	16	37
150,000	2.0	4.5	4.4	9.9	6.3	14	9.9	23	14	33	19	43
200,000	2.2	4.9	4.7	11	7.0	16	11	25	16	37	20	47

Table 5 - Class RK1,A6D Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.80	1.8	1.5	3.5	2.0	4.6	3.5	8.0	5.0	12	-	-
10,000	1.0	2.3	1.9	4.4	2.5	5.8	4.4	10.1	7.1	16.4	10	23
15,000	1.2	2.7	2.2	4.9	2.9	6.6	5.0	11.6	8.2	18.8	12	27
20,000	1.3	2.9	2.4	5.4	3.1	7.1	5.5	12	9.0	20.7	13	29
25,000	1.4	3.2	2.6	5.9	3.4	7.8	6.0	13.8	9.7	22.3	14	32
30,000	1.5	3.4	2.7	6.2	3.6	8.3	6.3	14.6	10.3	23.6	15	33
35,000	1.5	3.5	2.9	6.6	3.8	8.7	6.7	15.4	10.8	24.9	15	35
40,000	1.6	3.7	3.0	6.9	4.0	9.1	7.0	16.5	11.3	26	16	37
50,000	1.7	4.0	3.2	7.4	4.3	9.8	7.5	16.5	12.2	28	17	40
60,000	1.8	4.2	3.4	7.8	4.5	11.0	8.0	17	13	30	18	42
80,000	2.0	4.7	3.8	8.6	5.0	12	8.8	20.3	13	33	20	46
100,000	2.2	5.0	4.1	9.3	5.4	12	9.5	20	14	35	22	50
150,000	2.5	5.8	4.6	11	6.1	14	10.9	25	16	40	25	57
200,000	2.8	6.3	5.1	12	6.8	16	11	25	19	45	27	63

Table 6 - Class J, A4J Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.85	2.0	1.4	3.2	2.0	4.6	3.1	7.2	4.5	10	5.0	12
10,000	1.1	2.5	1.8	4.4	2.8	6.4	3.6	8.2	5.7	13	8.7	20
15,000	1.2	2.8	2.0	4.6	2.9	6.6	4.1	9.4	6.5	15	9.9	23
20,000	1.4	3.1	2.4	5.1	3.2	7.3	4.5	10	7.1	16	11	25
25,000	1.5	3.4	2.4	5.5	3.8	8.7	5.3	12	7.7	18	12	27
30,000	1.6	3.6	2.5	5.8	4.0	9.2	5.5	13	8.2	19	13	29
35,000	1.6	3.7	2.7	6.2	4.2	9.7	5.9	14	8.6	20	13	30
40,000	1.7	3.9	2.8	6.4	4.5	10	6.0	14	9.0	21	14	32
50,000	1.8	4.2	3.0	6.9	4.7	11	6.1	14	9.7	22	15	34
60,000	2.0	4.5	3.2	7.4	5.0	11	6.5	15	10	23	16	36
80,000	2.2	4.9	3.5	8.1	5.5	12	7.1	16	11	25	17	40
100,000	2.3	5.3	3.8	9.5	6.0	14	7.7	18	12	28	19	43
150,000	2.7	6.1	4.7	10.9	6.8	16	8.8	20	14	32	21	49
200,000	2.9	6.7	4.8	11	7.5	17	9.7	22	15	35	24	54

FUSE LET-THRU TABLES (Continued)

Apparent RMS Symmetrical Let-Thru Current

Table 7 - Class J, AJT Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.79	1.8	1.2	2.8	1.8	4.0	3.1	7.0	4.8	11	5.0	12
10,000	1.0	2.3	1.6	3.6	2.2	5.1	3.8	8.8	6.0	14	8.3	19
15,000	1.2	2.6	1.8	4.1	2.5	5.8	4.4	10	6.9	16	9.5	22
20,000	1.3	2.9	2.0	4.5	2.8	6.4	4.8	11	7.6	18	11	24
25,000	1.4	3.1	2.1	4.8	3.0	6.9	5.2	12	8.2	19	11	26
30,000	1.4	3.3	2.2	5.1	3.2	7.4	5.5	13	8.7	20	12	28
35,000	1.5	3.5	2.4	5.4	3.4	7.7	5.8	13	9.1	21	13	29
40,000	1.6	3.7	2.5	5.6	3.5	8.1	6.1	14	9.6	22	13	30
50,000	1.7	3.9	2.7	6.1	3.8	8.7	6.6	15	10.3	24	14	33
60,000	1.8	4.2	2.8	6.4	4.0	9.2	7.0	16	11	25	15	35
80,000	2.0	4.6	3.1	7.1	4.4	10	7.7	18	12	28	17	38
100,000	2.2	4.9	3.3	7.6	4.8	11	8.3	19	13	30	18	41
150,000	2.5	5.7	3.8	8.7	5.4	12	9.5	22	15	34	21	47
200,000	2.7	6.2	4.2	9.7	6.0	14	10.4	24	16	37	23	59

Table 8 - Class T, A6T Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES													
	30		60		100		200		400		600		800	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	Irms	Ip
5,000	.62	1.4	1.2	2.8	1.6	3.8	2.6	6.0	4.2	9.7	5.0	12	5.0	12
10,000	.78	1.8	1.5	3.5	2.1	4.8	3.3	7.5	5.3	12	8.2	19	10	22
15,000	.89	2.1	1.7	4.0	2.4	5.4	3.7	8.6	6.1	14	9.4	22	11	26
20,000	.98	2.3	1.9	4.4	2.6	6.0	4.1	9.5	6.7	15	10	24	12	28
25,000	1.1	2.4	2.0	4.8	2.8	6.5	4.4	10	7.2	17	11	26	13	31
30,000	1.1	2.6	2.2	5.0	3.0	6.9	4.7	11	7.7	18	12	27	14	32
35,000	1.2	2.7	2.3	5.3	3.1	7.2	5.0	11	8.1	19	12	29	15	34
40,000	1.2	2.9	2.4	5.6	3.3	7.5	5.2	12	8.5	19	13	30	16	36
50,000	1.3	3.1	2.6	6.0	3.5	8.1	5.6	13	9.1	21	14	32	17	38
60,000	1.4	3.3	2.8	6.4	3.8	8.6	5.9	14	9.7	22	15	34	18	41
80,000	1.6	3.6	3.0	7.0	4.1	9.5	6.5	15	11	25	16	38	20	45
100,000	1.7	3.9	3.2	7.5	4.5	10	7.0	16	11	26	18	40	21	48
150,000	1.9	4.4	3.8	8.6	5.1	12	8.1	19	13	30	20	46	24	55
200,000	2.1	4.9	4.1	9.5	5.6	13	8.9	20	14	33	22	51	27	61

Table 9 - Class T, A3T Fuses at 300 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES															
	30		60		100		200		400		600		800		1200	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.53	1.2	.95	2.2	1.4	3.1	2.0	4.6	3.0	6.9	4.5	10	5.0	12	5.0	12
10,000	.66	1.5	1.2	2.8	1.7	3.9	2.5	5.8	3.8	8.7	5.6	13	7.2	16	9.3	21
15,000	.76	1.7	1.4	3.2	2.0	4.5	2.9	6.6	4.4	10	6.4	15	8.2	19	11	24
20,000	.83	1.9	1.5	3.5	2.1	4.8	3.1	7.1	4.8	11	7.0	16	9.0	21	12	27
25,000	.90	2.1	1.6	3.7	2.3	5.3	3.4	7.8	5.2	12	7.6	17	9.7	22	13	29
30,000	.96	2.2	1.7	3.9	2.5	5.6	3.6	8.3	5.5	13	8.1	19	10	24	13	31
35,000	1.0	2.3	1.8	4.1	2.6	6.0	3.8	8.7	5.8	13	8.5	20	11	25	14	32
40,000	1.1	2.4	1.9	4.4	2.7	6.2	4.0	9.2	6.0	14	8.9	20	11	26	15	34
50,000	1.1	2.6	2.1	4.7	2.9	6.7	4.3	9.9	6.5	15	9.6	22	12	28	16	37
60,000	1.2	2.8	2.2	5.1	3.1	7.1	4.5	10	6.9	16	10	23	13	30	17	39
80,000	1.3	3.1	2.4	5.5	3.4	7.8	5.0	12	7.6	17	11	26	14	33	19	43
100,000	1.4	3.3	2.6	6.0	3.7	8.4	5.4	12	8.2	19	12	28	15	35	20	46
150,000	1.6	3.7	3.0	6.8	4.2	9.7	6.1	14	9.4	22	14	32	18	41	23	53
200,000	1.8	4.1	3.3	7.5	4.6	11	6.8	16	10	24	15	35	19	45	25	58

FUSE LET-THRU TABLES (Continued)

Apparent RMS Symmetrical Let-Thru Current

Table 10- Class RK1, A2K Fuses at 250 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.61	1.4	1.4	3.2	1.7	4.0	2.9	6.7	4.4	10	5.0	12
10,000	.77	1.8	1.7	4.0	2.2	5.0	3.7	8.5	5.5	13	7.4	17
15,000	.88	2.0	2.0	4.6	2.5	5.8	4.2	9.7	6.3	14	8.5	19
20,000	.97	2.2	2.2	5.0	2.8	6.3	4.6	11	6.9	16	9.3	21
25,000	1.1	2.4	2.4	5.4	3.0	6.8	5.0	12	7.4	17	10	23
30,000	1.1	2.6	2.5	5.8	3.2	7.3	5.3	12	7.9	18	11	25
35,000	1.2	2.7	2.6	6.0	3.3	7.7	5.6	13	8.3	19	11	26
40,000	1.2	2.8	2.8	6.3	3.5	8.0	5.9	13	8.7	20	12	27
50,000	1.3	3.0	3.0	6.8	3.8	8.6	6.3	14	9.4	22	13	29
60,000	1.4	3.2	3.2	7.2	4.0	9.2	6.7	15	10	23	13	31
80,000	1.5	3.5	3.5	8.0	4.4	10	7.4	17	11	25	15	34
100,000	1.7	3.8	3.7	8.6	4.7	11	7.9	18	12	27	16	37
150,000	1.9	4.4	4.3	9.8	5.4	12	9.1	21	14	31	18	42
200,000	2.1	4.8	4.7	11	6.0	14	10	23	15	34	20	46

Table 11 - Class RK1, A2D Fuses at 250 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	.77	1.8	1.4	3.2	2.0	4.6	3.2	7.3	5.0	12	5.0	12
10,000	.97	2.2	1.8	4.0	2.5	5.8	4.0	9.2	6.4	15	8.0	18
15,000	1.1	2.6	2.0	4.6	2.9	6.6	4.6	11	7.3	17	9.2	21
20,000	1.2	2.8	2.2	5.1	3.2	7.3	5.0	12	8.1	19	10	23
25,000	1.3	3.0	2.4	5.5	3.4	7.9	5.4	12	8.7	20	11	25
30,000	1.4	3.2	2.5	5.8	3.6	8.3	5.8	13	9.2	21	12	27
35,000	1.5	3.4	2.7	6.1	3.8	8.8	6.1	14	9.7	22	12	28
40,000	1.5	3.5	2.8	5.7	4.0	9.2	6.4	15	10	23	13	29
50,000	1.7	3.8	3.0	6.9	4.3	9.9	6.8	16	11	25	14	32
60,000	1.8	4.0	3.2	7.3	4.6	11	7.3	17	12	27	15	34
80,000	1.9	4.5	3.5	8.1	5.0	12	8.0	18	13	29	16	37
100,000	2.1	4.8	3.8	8.7	5.4	12	8.6	20	14	32	17	40
150,000	2.4	5.5	4.3	9.9	6.2	14	9.9	23	16	36	20	46
200,000	2.6	6.0	4.8	11	6.8	16	11	25	17	40	22	50

Table 12 - Class RK5, TRS Fuses at 600 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	1.7	3.9	3.2	7.4	3.4	7.8	5.0	12	-	-	-	-
10,000	2.1	4.8	4.0	9.2	4.2	9.7	6.2	14	10	23	10	23
15,000	2.4	5.5	4.6	11	4.8	11	7.1	16	12	27	15	35
20,000	2.7	6.2	5.1	12	5.3	12	7.8	18	13	30	18	42
25,000	2.9	6.7	5.5	13	5.7	13	8.4	19	14	32	20	45
30,000	3.1	7.1	5.8	13	6.1	14	8.9	20	15	35	21	48
35,000	3.3	7.6	6.1	14	6.4	15	9.4	22	16	36	22	50
40,000	3.4	7.8	6.4	15	6.7	15	9.8	23	17	38	23	53
50,000	3.7	8.5	6.9	16	7.2	17	11	24	18	41	25	57
60,000	3.9	9.0	7.3	17	7.7	18	11	26	19	43	26	60
80,000	4.3	9.9	8.1	19	8.5	20	12	29	21	48	29	66
100,000	4.6	11	8.7	20	9.1	21	13	31	22	52	31	72
150,000	5.3	12	9.9	23	10	24	15	35	26	59	36	82
200,000	5.8	13	11	25	12	26	17	39	28	65	39	90

FUSE LET-THRU TABLES (Continued)

Apparent RMS Symmetrical Let-Thru Current

Table 13 - Class RK5, TR Fuses at 250 Volts AC, 15% Power Factor

PROSPECTIVE SHORT CIRCUIT RMS. SYM AMPERES	FUSE LET-THRU CURRENT IN KILO-AMPERES BY FUSE RATING IN AMPERES											
	30		60		100		200		400		600	
	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip	irms	Ip
5,000	1.4	3.2	3.0	6.9	3.2	7.4	5.0	12	-	-	-	-
10,000	1.8	4.1	3.8	8.7	4.1	9.4	6.6	15	10	23	10	23
15,000	2.1	4.8	4.4	10	4.7	11	7.6	17	13	29	15	35
20,000	2.3	5.3	4.8	11	5.1	12	8.4	19	14	32	19	44
25,000	2.5	5.6	5.2	12	5.5	13	9.0	21	15	34	21	48
30,000	2.6	6.0	5.5	13	5.9	14	9.6	22	16	37	22	50
35,000	2.7	6.2	5.8	13	6.2	14	10	23	17	38	23	53
40,000	2.9	6.7	6.1	14	6.5	15	11	24	18	40	24	56
50,000	3.1	7.1	6.5	15	7.0	16	11	26	19	43	26	60
60,000	3.3	7.6	7.0	16	7.4	17	12	27	20	46	28	63
80,000	3.6	8.3	7.7	18	8.1	19	13	31	22	51	30	70
100,000	3.9	9.0	8.3	19	8.8	20	14	33	24	55	33	75
150,000	4.4	10	9.4	22	10	23	16	38	27	62	38	86
200,000	4.9	11	11	24	11	26	18	41	30	69	41	95

BUS DUCT SHORT-CIRCUIT PROTECTION

Bus duct listed to the UL 857 standard is labeled with a "short-circuit current rating". To earn this rating the bus duct must be capable of surviving its "short-circuit current rating" for 3 full cycles (60 Hz basis).

The following table shows the potential short-circuit current ratings for both feeder and plug-in bus duct. Also shown are the peak instantaneous currents the bus duct must be capable of withstanding to earn a given "short-circuit current rating".

Current-limiting fuses may be used to protect bus duct from fault currents that exceed the bus duct "short-circuit current rating". The fuse will provide short-circuit protection if fuse peak let-thru current does not exceed the bus duct peak instantaneous withstand current. In addition, the fuse total clearing curve must fall to the left of the bus duct short-circuit current rating at the 3 cycle (.05 sec.) point. The fuse ampere ratings shown in this table satisfy both of these requirements.

Example:
In a 480V circuit with 100,000A available short-circuit current, what maximum size fuse can be used to protect feeder bus duct which has a 42,000 short-circuit rating?

Answer:
From the table, A Ferraz Shawmut 1600A Class L fuse A4BQ1600 will protect this bus duct up to 100,000 amperes.

FEEDER & PLUG-IN BUS DUCT		MAXIMUM FERRAZ SHAWMUT FUSE FOR SHORT-CIRCUIT PROTECTION*		
Short Circuit Current Rating in Amperes	Peak Instantaneous Withstand Current in Amperes	50,000A	100,000A	200,000A
5000	8500	60A	60A	30A
7500	13,000	100A	100A	100A
10,000	17,000	200A	100A	100A
14,000	28,000	400A	400A	200A
22,000	48,000	800A	600A	400A
25,000	55,000	1000A	600A	600A
30,000	66,000	1200A	800A	600A
35,000	76,000	1600A	1000A	800A
42,000	92,000	2500A	1600A	1000A
50,000	110,000	3000A	2000A	1200A
65,000	142,000	4000A	3000A	2500A
75,000	160,000	5000A	4000A	3000A
85,000	180,000	5000A	5000A	4000A
100,000	220,000	6000A	6000A	5000A
125,000	270,000	6000A	6000A	6000A
150,000	330,000	6000A	6000A	6000A

* 30A to 600A fuses – Class J (*time delay AJT)
Class RK1 (A2K/A6K or time delay A2D/A6D)

800 to 6000A fuses – Class L (A4BQ)

CAPACITOR PROTECTION

The primary responsibility of a capacitor fuse is to isolate a shorted capacitor before the capacitor can damage surrounding equipment or personnel. Typical capacitor failure occurs when the dielectric in the capacitor is no longer able to withstand the applied voltage. A low impedance current path results. The excessive heat generated builds pressure and can cause violent case rupture. A fuse will isolate the shorted capacitor before case rupture occurs.

Fuse Placement

The Code requires that an overcurrent device be placed in each ungrounded conductor of each capacitor bank (see Figure 1). The Code further requires that the rating or setting of the over current device be as low as practicable. A separate overcurrent device is not required if the capacitor is connected on the load side of a motor-running overcurrent device.

Fusing per the Code provides reasonable protection if the capacitors are the metalized film self-healing type. If not, each capacitor should be individually fused as shown in Figure 2.

Fusing each individual capacitor is especially important in large banks of parallel capacitors. Should one capacitor fail, the parallel capacitors will discharge into the faulted capacitor and violent case rupture of the faulted capacitor can result. Individual capacitor fusing eliminates this problem.

If the capacitors are to be placed in banks comprised of both series and parallel combinations, the capacitor manufacturer must be consulted for fuse placement recommendations. The opening of improperly placed fuses can cause overvoltage and result in damage to other capacitors in the network.

Ampere rating

How much overcurrent can a capacitor withstand? What effects do neighboring capacitors have on the inrush of a given capacitor? These and other questions influence fuse selection. Circuit analysis can be very complex. It is best to consult the capacitor manufacturer for specific recommendations.

In lieu of specific fusing recommendations from the capacitor manufacturer, we suggest a Shawmut A60C type 121 or an A6Y Type 2SG fuse sized at 165% to 200% of the capacitor's current rating. If these fuses are not dimensionally acceptable, then a non-time delay Class J or Class RK1 fuse could be used and sized at 185% to 220% of the capacitor's current rating.

Capacitor fuses are selected for their ability to provide short circuit protection and to ride through capacitor inrush current. Inrush current is affected by the closing angle, capacitance, resistance and inductance of the circuit, and varies from one application to another. Inrush lasts for less than 1/4 cycle and is typically less than ten times the capacitor's current rating.

Fuse Placement (NEC)

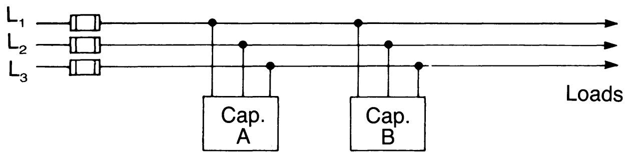


Figure 1

Preferred Fuse Placement

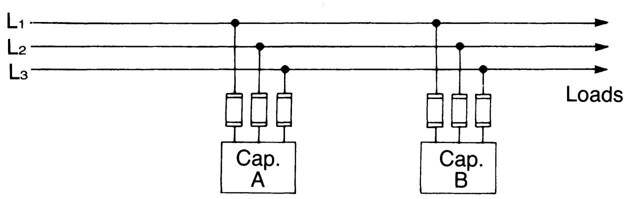


Figure 2

Steady state capacitor current is proportional to the applied voltage and frequency. Since voltage and frequency are fixed in power factor correction applications, the capacitor is not expected to be subjected to an overload. Therefore, capacitor fuses are not selected to provide overload protection for the capacitor.

KVAR vs. AMPS

The capacitor's current rating can be derived from its KVAR rating by using the following formula:

$$\frac{\text{KVAR x 1000}}{\text{volts}} = \text{amps}$$

1 KVAR = 1000VA (Reactive)

Example: What fuse would you recommend for a three phase capacitor rated 100KVAR at 480 volts?

$$\frac{\text{100,000 volt-amps}}{\text{480 volts}} = \text{208 amps}$$

To determine line current, we must divide the 208 amps, which is the three phase current by $\sqrt{3}$

$$\frac{208}{\sqrt{3}} = \text{120 amps}$$

If an A60C Type 121 fuse is to be used, size the fuse at 165% to 200% of line current.

120 amps x 1.65 = 198 amps
120 amps x 2.00 = 240 amps

Suggestions: A60C200-121 or A60C200-121TI

If a Class J or a Class RK1 is to be used, size the fuse at 185% to 220% of line current.

120 amps x 1.85 = 222 amps
120 amps x 2.20 = 264 amps

Suggestions: A4J225 or A6K225R

CABLE PROTECTION

Using Cable Protectors

Cable Protectors are special purpose limiters which are used to protect service entrance and distribution cable runs. Though not required by the Code for overcurrent protection, the Code does recognize the use of Cable Protector as current limiting devices.

When unprotected cables are paralleled, a singe conductor faulting to ground can result in damage to and eventual loss of all parallel conductors. The resultant cost of cable replacement, loss of service, and down time can be significant. This cost can be minimized by the use of Cable Protectors.

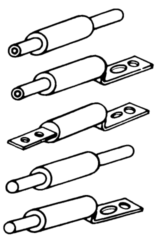
When each phase consists of three or more parallel conductors, Cable Protectors are installed at each end of each conductor. Should one cable fault, the Cable Protectors at each end of the faulted cable will open and isolate the faulted cable. The unfaulted cables will maintain service.

Terminations

In addition to improving system reliability, Cable Protectors provide a means of terminating cable, thus eliminating the need for cable lugs. Cable Protectors are available with the following configurations:

Aluminum and copper cable require different terminations. Cable

—Cable to cable — Type 1
—Cable to offset bus — Type 3
—Bus to offset bus — Type 5
—Mole to cable — Type 6
—Mole to offset bus — Type 8



Protectors intended for copper cable must not be used with aluminum cable. Cable Protectors intended for aluminum cable include an oxide inhibitor and can be used on either aluminum or copper cable.

Placement of Cable Protectors

In single phase applications where a single transformer supplies the service and there are only one or two conductors per phase, a single Cable Protector per cable may be used. The Cable Protector should be located at the supply end of the cable. In all other applications, Cable Protectors should be placed at both ends of each cable. This allows a faulted cable to be isolated from the source end and from a back feed at its load end. Isolation of a faulted cable is only possible if there are 3 or more parallel cables per phase.

Cable Protector Ampacity

Cable Protectors are not ampere rated. They are not intended to provide overload protection for the cable. Cable Protectors are designed to open in case of a short circuit or after a cable has faulted. Thus total system reliability is maximized. For these reasons Cable Protectors are rated in terms of the cable material (aluminum or copper) and the cable cable size (250kcmil, 500kcmil, etc.)

Selecting a Cable Protector

The following questions must be answered to choose the correct Cable Protector:

- Is the cable copper or aluminum?
- What is the cable size?
- What termination type is desired?
- Is the Cable Protector to be insulated or protected with a heat-shrink sleeve or a rubber boot?

Once these questions have been answered, the Cable Protector catalog number can be chosen from the listings.

Small Cable Sizes

Class J fuses may be used for cable sizes smaller than 4/0. Since Class J blades are drilled for bolting, they may be attached directly to bus. Cables must be prepared by installing lugs before bolting to the fuse. Cable-to-bus or cable-to-cable terminations are possible. The following ampere ratings are recommended, for each cable size.

CABLE - SIZE AWG CU or AL	CLASS J FUSE CATALOG NUMBER
#4	A4J125
#3	A4J150
#2	A4J175
#1	A4J200
1/0	A4J250
2/0	A4J300
3/0	A4J400

WELDER PROTECTION

General

Articles 630-12 and 630-32 of the National Electrical Code requires that electric welders and their supply conductors have overcurrent protection. The Code further requires that each welder have a nameplate which provides information necessary for the selection of the appropriate supply conductors and overcurrent protection devices.

While either circuit breakers or fuses may be used for overcurrent protection, the typically high available fault currents and the need for overall system selective coordination favor the use of current-limiting fuses.

Supply Conductor Protection

For AC transformer, DC rectifier and motor-generator arc welders the supply conductors should be fused at not more than 200% of the conductor ampere rating. For resistance welders the Code allows fusing at up to 300% of conductor ampere rating. In both applications a time delay RK5 fuse such as the Tri-onic® is generally recommended.

Welder Protection

To comply with the Code, AC transformer, DC rectifier and motor-generator arc welders should be fused at not more than 200% of their primary current rating (shown on welder nameplate). Resistance welders should be fused at not more than 300% of their primary current rating. As with supply conductors, RK5 time delay fuses such as the Tri-onic® are recommended. It should be noted that the Code states that a separate overcurrent device is not required for the welder if the supply conductors are protected by an overcurrent device which will satisfy the welder overcurrent protection requirements.

Special Applications

UL class fuses sized according to the Code may not be suitable in some welding applications. High ambient temperatures, high cycle rates and high available fault currents may require the use of Ferraz Shawmut Welder Protectors.

Welder Protectors (A4BX Type 150 or Type 150J) are special purpose limiters which have been designed specifically for welding applications to protect equipment in case of short circuits. They have twice the thermal rating of UL Class fuses yet provide a low clearing I^2t . This combination minimizes fuse fatigue and allows effective coordination with upstream devices. Welder Protectors may be sized closer to welder primary ampere rating than UL Class fuses, hence may allow the use of smaller disconnect switches.

Welder Protectors are intended for short circuit protection and are not intended for overload protection. They should never be used as the only protective device on any welder application. Thermal overload protection must be provided in the welder by some other device.

SELECTIVITY BETWEEN 240, 480 OR 600 VOLT MAIN AND BRANCH FUSES

Definition

"Coordination is defined as properly localizing a fault condition to restrict outages to the equipment affected, accomplished by choice of selective fault protective devices."[1]

Coordination (selectivity, discrimination) is desirable and often times mandatory. A lack of coordination can represent a hazard to people and equipment. When designing for coordination, fuses provide distinct advantages over other types of overcurrent protective devices.

To coordinate a circuit breaker protected system, it is generally necessary intentionally to delay the short circuit response of upstream breakers. Though coordination may be achieved, short circuit protection is compromised. The speed and consistency of response of fuses allows coordination without compromising component protection.

The terms coordination and selectivity are often used interchangeably. The term coordination should be used to describe a system as defined above, while two fuses are said to be selective if the downstream fuse opens while the upstream fuse remains operable under **all** conditions of overcurrent. The term "discrimination" is synonymous with selectivity and is the preferred international term for this definition.

The word **all** is key. Fuse selectivity cannot be assured by comparing fuse time current curves alone. These curves stop at .01 second. Fuse performance under high fault conditions must also be evaluated. Fuse I^2t is the best tool for assuring coordination under high fault current conditions. If the total clearing I^2t of the downstream fuse is less than the melting I^2t of the main upstream fuse, the fuses will be selective under high fault conditions.

To simplify presenting weighty I^2t data, selectivity information can simply be found in selectivity ratio tables.

The ratios found in the following tables are conservative and are appropriate for all overcurrents up to 200,000 amperes RMS. In some cases smaller ratios than shown may be used. Consult your Ferraz Shawmut representative for specific recommendations.

Fuse Selectivity Ratios - 600 and 480 Volt Applications Up to 200,000 RMS Symmetrical Amperes

BRANCH	RATIO*								
	MAIN FUSE								
FUSE	A4BQ	A4BY	A4BT	TRS	A6K	A6D	A4J	AJT	A6T
A4BQ	2:1	2:1	2:1	-	-	-	-	-	-
A4BY	-	2.5:1	2:1	-	-	-	-	-	-
A4BT	2.5:1	2.5:1	2:1	-	-	-	-	-	-
TRS	4:1	4:1	3:1	2:1	4:1	4:1	4:1	3:1	4.5:1
A6K	2:1	2:1	1.5:1	1.5:1	2:1	2:1	3:1	2:1	3.5:1
A6D	2:1	2:1	1.5:1	1.5:1	2:1	2:1	3:1	2:1	3.5:1
A4J	2:1	2:1	1.5:1	1.5:1	2:1	2:1	2:1	2:1	3:1
AJT	2:1**	2:1**	2:1	1.5:1	2:1	2:1	2.5:1	2:1	3.5:1
A6T	3:1	2.5:1	2:1	1.5:1	2:1	2:1	2:1	2:1	2.5:1

Fuse Selectivity Ratios - 240 Volt Applications Up to 200,000 RMS Symmetrical Amperes

BRANCH	RATIO*								
	MAIN FUSE								
FUSE	A4BQ	A4BY	A4BT	TR	A2K	A2D	A4J	AJT	A3T
A4BQ	2:1	2:1	2:1	-	-	-	-	-	-
A4BY	-	2.5:1	2:1	-	-	-	-	-	-
A4BT	2.5:1	2.5:1	2:1	-	-	-	-	-	-
TR	4:1	4:1	4:1	1.5:1	4:1	3:1	4:1	3:1	5:1
A2K	2:1	2:1	1.5:1	1.5:1	2:1	1.5:1	2:1	1.5:1	3:1
A2D	2.5:1	2.5:1	2:1	1.5:1	2:1	1:5:1	2:1	2:1	3:1
A4J	2:1	2:1	1.5:1	1.5:1	2:1	1.5:1	2:1	2:1	3:1
AJT	2:1	2:1	2:1	1.5:1	2.5:1	2:1	2.5:1	2:1	3:1
A3T	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	2:1

*These ratios apply to fuses rated 61-6000A.

**Exception: For AJT450-600 use 2:1 on 480V only, 2.25:1 on 600V.

AMP-TRAP 2000

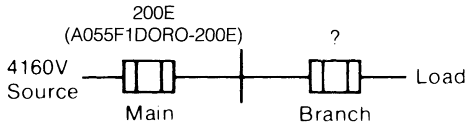
SELECTIVITY BETWEEN TWO E-RATED FUSES IN SERIES

A selective system eliminates unnecessary power outages and costly downtime in the remainder of the system not directly affected by the fault condition. This results in significant savings and safety for the user.

In a properly designed selective system a branch fuse must open the circuit under fault conditions without damaging the main fuse. This is accomplished by making sure that the required Minimum Melting energy of the main fuse is greater than the Total Clearing energy required to "open" the branch fuse.

Example:
In a 4160V system fed by a 200E main fuse (A055F1DORO-200E or equivalent), what is the maximum branch fuse allowable to maintain selectivity between the two?

From the table, the maximum E-rated branch fuse is 100E (A055F1DORO-100E or equivalent).



FUSE RATINGS			
2400, 4160 or 4800V SYSTEMS		**6.9 thru 14.4KV SYSTEMS**	
MAX. BRANCH	**MIN. MAIN**	**MAX. BRANCH**	**MIN. MAIN**
10E	20E	10E	20E
15E	25E	15E	25E
20E	40E	20E	30E
25E	40E	25E	50E
30E	50E	30E	65E
40E	65E	40E	65E
50E	80E	50E	80E
65E	125E	65E	125E
80E	150E	80E	150E
100E	200E	100E	200E
125E	250E	-	-
150E	250E	-	-
200E	400E	-	-
250E	400E	-	-
300E	450E	-	-
400E	-	-	-

Note: Selectivity is maintained on all overcurrents up to the maximum interrupting rating of the branch fuse.

Recommended Fuses: Ferraz Shawmut
CS-3: 5kV-A055F, 8kV-A825X*, 15kV-A155F
CL-14: 5KV-A055C, A055B, 15kV-A155C
*Consult factory for information on A825X series.

SELECTIVITY OF E-RATED PRIMARY AND LOW VOLTAGE SECONDARY FUSES

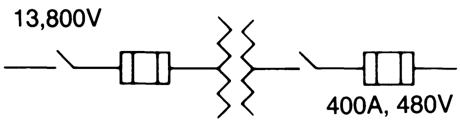
Good design dictates that transformer secondary fuses should clear overcurrents before transformer primary fuses open. The following table shows the smallest primary fuse E rating which will be selective with a given secondary fuse.

Fuses are assumed to be Ferraz Shawmut Type CS-3 or CL-14 for primary, A4BY or A4BQ (Class L) for secondary 800 amperes and larger, Class J or Class RK1 for secondary 600 amperes and smaller.

The critical point for coordinating E-rated to low voltage fuses is in the 5-second to 10-second region of the fuse time current curves. This means that non-time delay secondary fuses will be selective with a lower E-rated primary fuse than will time delay secondary fuses. For this reason two E ratings are shown for most 600 ampere and smaller secondary fuses. The lower E rating will be selective with a non-time delay Class J or Class RK1. The higher E rating shown is required for selectivity with a time delay Class J or Class RK1.

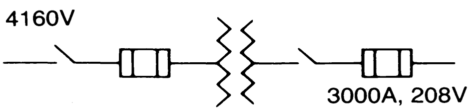
The worst case condition for secondary fuse to primary fuse selectivity occurs when a line-to-line secondary fault develops on a delta-to-wye transformer. One of the primary fuses will see 116% of the turns ratio current. This worst case condition was assumed when the tables that follow were developed.

Example 1:.
With A6K400R (400A Class RK1) fuses as 480V secondary mains of a 13,800V/480V supply transformer, what is the minimum 13,800V primary fuse necessary for selectivity?



Answer:
Since the A6K400R is not a time delay fuse it will coordinate with a 20E primary fuse (A155F1DORO-20E or equivalent).

Example 2:
A 4160V distribution transformer supplies a 3000A, 208V main panel. What minimum 4160V primary fuse is needed to assure



selectivity?

Answer:
A 200E primary fuse (A055F1DORO-200E or equivalent).

SEC. FUSE AMPERE RATING	MINIMUM PRIMARY FUSE RATING* PRIMARY VOLTAGE				
	2400	4160	4800	6900	13,800
480 Secondary					
200	50E (80E)	30E (50E)	25E (40E)	20E (30E)	10E (15E)
400	100E (125E)	50E (80E)	50E (65E)	40E (50E)	20E (25E)
600	125E (200E)	100E (125E)	80E (125E)	65E (100E)	30E (50E)
800	250E	150E	125E	100E	50E
1000	300E	150E	150E	125E	50E
1200	350E	200E	200E	125E	65E
1600	500E	250E	250E	150E	100E
2000	600E	300E	300E	200E	100E
2500	-	450E	400E	-	125E
3000	-	500E	450E	-	150E
4000	-	-	600E	-	200E
5000	-	-	-	-	-
6000	-	-	-	-	-
240V Secondary					
200	25E (40E)	15E (25E)	15E (20E)	10E (15E)	10E
400	50E (80E)	30E (50E)	25E (40E)	20E (30E)	10E (15E)
600	80E (125E)	50E (65E)	40E (65E)	30E (40E)	15E (20E)
800	125E	80E	65E	50E	25E
1000	150E	100E	80E	65E	30E
1200	200E	125E	100E	65E	40E
1600	250E	125E	125E	100E	50E
2000	300E	150E	150E	125E	65E
2500	400E	250E	200E	150E	80E
3000	450E	250E	250E	150E	100E
4000	600E	400E	300E	200E	125E
5000	-	400E	400E	-	125E
6000	-	500E	450E	-	150E
208V Secondary					
200	20E (40E)	15E (25E)	10E (20E)	10E (15E)	10E
400	50E (80E)	25E (40E)	25E (40E)	15E (25E)	10E (15E)
600	65E (100E)	40E (65E)	40E (50E)	25E (40E)	15E (20E)
800	125E	65E	65E	50E	20E
1000	125E	80E	65E	50E	25E
1200	150E	100E	80E	65E	30E
1600	200E	125E	125E	80E	40E
2000	250E	150E	125E	100E	50E
2500	350E	200E	200E	125E	80E
3000	400E	200E	200E	150E	80E
4000	600E	300E	250E	200E	125E
5000	-	400E	350E	-	125E
6000	-	450E	400E	-	150E

* ( ) indicates primary fuse rating when secondary fuse is time delay type

Recommended Fuses: Ferraz Shawmut
Secondary, 200-600A - Class J (A4J or AJT) or RK1 (A2K or A2D 250V) (A6K or A6D 600V)
Secondary, 800-6000A - Class L (A4BY or A4BQ)
CS-3: 5kV-A055F, 8kV-A825X,* 15kV-A155F
CL-14: 5kV-A055C, A055B, 15kV-A155C
*Consult factory for information on A825X Series.

SELECTIVITY BETWEEN E-RATED PRIMARY AND E-RATED SECONDARY FUSES

Some applications require selectivity between transformer secondary fuses and transformer primary fuses. The table below shows the smallest 15.5KV E-rated primary fuse which will be selective with a given E-rated secondary fuse. The table assures selectivity for Ferraz Shawmut Type CS-3 and CL-14 E-rated fuses under all current levels and under the worst case situation. The worst case situation exists when the following conditions occur simultaneously:

- Transformer is delta primary and wye secondary (see figure).
- A line-to-line secondary fault occurs.
- The fault current through a primary fuse is equal to the primary fuse 0.01 second melt current.

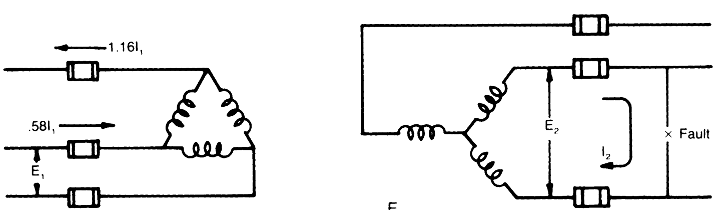
The worst case condition rarely occurs. In most cases selectivity will be maintained with a primary fuse one size smaller than shown in this table.

Primary Fuse Ratings Selective With Secondary Ratings

SECONDARY FUSE RATING	MINIMUM 13.8KV PRIMARY FUSE RATING SECONDARY VOLTAGE			
	2400	4160	4800	6900
10E	10E	10E	10E	15E
15E	10E	10E	15E	20E
20E	10E	15E	20E	20E
25E	10E	20E	25E	30E
30E	15E	25E	25E	40E
40E	20E	30E	40E	50E
50E	25E	40E	40E	65E
65E	30E	50E	65E	100E
80E	40E	65E	80E	100E
100E	50E	80E	100E	125E
125E	65E	100E	125E	150E
150E	80E	125E	125E	200E
200E	100E	150E	150E	-
250E	125E	200E	200E	-
300E	125E	-	-	-
400E	150E	-	-	-
450E	200E	-	-	-
600E	-	-	-	-

Recommended Fuses: Ferraz Shawmut CS-3: 5kV-A055F, 8kV-A825X,* 15kV-A155F; CL-14: 5kV-A055C, A055B, 15kV-A155C

*Consult factory for information on A825X Series.



Maximum $I_1 = 1.16 \times \frac{E_2}{E_1} \times I_2$

SELECTIVITY BETWEEN E-RATED PRIMARY FUSES AND R-RATED SECONDARY MOTOR FUSES

Good design dictates that transformer secondary fuses shall clear overcurrents and not allow the primary fuse to open, thereby maintaining selectivity between the two.

With any system involving R-rated fuses, a contactor and overload relay must be employed to open on low overload currents. It is assumed in the table that the overload relay is properly selected and that the R-rated fuse is only required to open on overcurrents which are large enough for the fuse to open in times less than 20 seconds.

With the proper selection of the overload relay, selectivity is maintained throughout the full range of potential overcurrents. The contactor overload relay maintains selectivity with the E-rated primary fuse for low level overcurrents corresponding to opening times of 20 seconds and longer. The R-rated fuse maintains selectivity with the E-rated primary fuse on all higher level overcurrents corresponding to opening times of 20 seconds and shorter. Thus selectivity is maintained on all overcurrents to the maximum current interrupting rating published for the R-rated fuses.

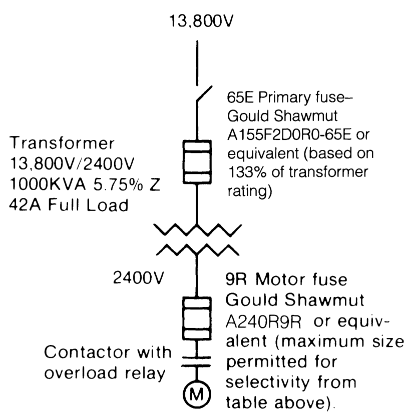
Selective Primary and Secondary Motor Fuse Ratings

SECONDARY FUSE R RATING	MINIMUM PRIMARY FUSE E RATING PRIMARY VOLTAGE 4160V	4800V	6900V	13.8KV
2400V Secondary System				
2R	50E	50E	30E	15E
3R	80E	65E	50E	25E
4R	100E	100E	65E	30E
6R	125E	125E	100E	50E
9R	200E	200E	125E	65E
12R	250E	250E	150E	100E
18R	400E	350E	-	125E
24R	600E	450E	-	150E
36R	-	-	-	-
4800V Secondary System				
2R	-	-	65E	30E
3R	-	-	100E	50E
4R	-	-	125E	65E
6R	-	-	150E	100E
9R	-	-	-	125E
12R	-	-	-	150E
18R	-	-	-	-
24R	-	-	-	-
36R	-	-	-	-
6900V Secondary System				
2R	-	-	-	40E
3R	-	-	-	65E
4R	-	-	-	80E
6R	-	-	-	125E
9R	-	-	-	150E
12R	-	-	-	200E
18R	-	-	-	-

Recommended Fuses: Ferraz Shawmut
R-rated - A240R, A480R, A720R or equivalent
E-rated - CS-3: 5KV-A055F, 8KV-A825X,* 15KV-A155F
CL-14: 5KV-A055C, A055B, 15KV-A155C
* Consult factory for information on A825X Series.

Example:
In a 13800V/2400V distribution system, what is the maximum size 2400V motor fuse which can be used if the distribution transformer primary is fused at 65E?

Answer:
From the table, a 9R motor fuse (Ferraz Shawmut A240R9R) is the maximum size which can be used. If the 9R motor fuse opens on any overcurrent, it will not affect the 65E primary fuse, and selectivity is maintained.



SELECTIVITY BETWEEN E-RATED MAIN FUSE AND R-RATED MOTOR FUSE IN SERIES

Feeder fuses and motor fuses in series must be selective. Selectivity assures that the motor fuse only will open, and not the feeder fuse, thus eliminating power outages to the remainder of the branch circuits.

Selectivity is accomplished by assuring that the required minimum melting energy of the feeder fuse is greater than the total clearing energy required to open the motor fuse.

With any system involving R-rated fuses, a contactor and overload relay must be employed to open on low overhead currents. This table assumes that the overload relay is properly selected and that the R-rated fuse is only required to open on overcurrents which are large enough to open the fuse in 20 seconds or less.

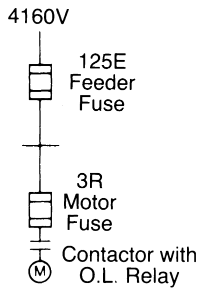
Proper selection of the overload relay assures selectivity for all overcurrents. The contactor and relay in combination are selective with the E-rated fuse for low level overloads which correspond to opening times longer than 20 seconds. The R-rated fuse is selective with the E-rated fuse for higher level overcurrents up to the maximum interrupting rating of the R-rated fuse.

Selective Main and Motor Fuse Ratings in Series

2400, 4160, 4800, 6900 or 7200V SYSTEMS	
MOTOR FUSE R RATING	**MINIMUM MAIN FUSE E RATING**
2R	80E
3R	125E
4R	150E
6R	200E
9R	300E
12R	400E
18R	600E
24R	-
36R	-

Recommended Fuses: Ferraz Shawmut
R-rated - A240R, A480R, A720R* or equivalent
E-rated - CS-3: 5KV-A055F, 8KV-A825X,* 15KV-A155F
CL-14: 5KV-A055C, A055B, 15KV-A155C
*Consult factory for information on A825X Series.

Example:
In a 4160V system, a motor requiring a 3R fuse is to be installed. What is the minimum E-rated feeder fuse required



ahead of the motor?

Answer:
From the table, a 3R motor fuse (Ferraz Shawmut A480R3R-1) requires a minimum 125E distribution fuse (Ferraz Shawmut A055F1DORO-125E) upstream for proper selectivity. If the 3R motor fuse opens on any overcurrent, it will not affect the 125 E feeder fuse.

QUICK THREE PHASE SHORT CIRCUIT CALCULATIONS

Short circuit current levels must be known before fuses or other equipment can be correctly applied. For fuses, unlike circuit breakers, there are four levels of interest. These are 10,000, 50,000, 100,000 and 200,000 RMS symmetrical amperes.

Rigorous determination of short circuit currents requires accurate reactance and resistance data for each power component from the utility generating station down to the point of the fault. It is time-consuming for a plant engineer to collect all this information and yet he is the one most affected by short circuit hazards.

There have been several approaches to "easy" short circuit calculations which have been cumbersome to be of practical use. The method described here is not new but it is the simplest of all approaches.

Example 1:
What is the potential short circuit current at various points in a 480V, 3-phase system fed by a 1000KVA, 5.75%Z transformer? (Assume primary short circuit power to be 500MVA.)

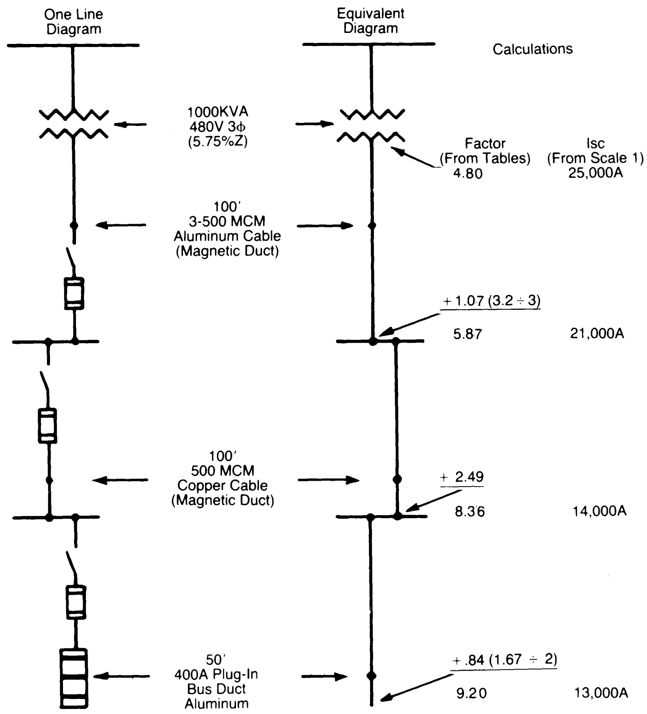
In summary, each basic component of the industrial electrical distribution system is pre-assigned a *single* factor based on the impedance it adds to the system. For instance, a 1000KVA, 480 volt, 5.75%Z transformer has a factor of 4.80 obtained from Table A. This factor corresponds with 25,000 RMS short circuit amperes (directly read on Scale 1). Note: Factors change proportionally with transformer impedance. If this transformer were 5.00%Z, the factor would be 5.00/5.75 x 4.80 = 4.17.

Cable and bus factors are based on 100 foot lengths. Shorter or longer lengths have proportionately smaller or larger factors (i.e. 50' length = 1/2 factor; 200' length = 2 x factor). Basic component factors are listed on following pages in tables A through D.

To find the short circuit current at any point in the system, simply add the factors as they appear in the system from service entrance to fault point and read the available current on Scale 1.

Example 2:
If the primary short circuit power were 50MVA (instead of 500MVA) in this same system, what would Isc be at the transformer? At the end of the bus duct run?

Answer:
From the Primary MVA correction factor table A1, the factor for 50MVA (at 480V) is 1.74. The new factor at the transformer is then 4.80 + 1.74 = 6.54 and Isc is reduced to 18,000A (Scale 1). The new factor at the bus duct is 9.21 + 1.74 = 10.95 Isc = 11,000A (Scale 1).



QUICK THREE PHASE SHORT CIRCUIT CALCULATIONS (Continued)

Component Factor Tables- Transformers

The transformer factors are based on available primary short circuit power of 500MVA and listed in Table A. For systems with other than 500MVA primary short circuit power, add the appropriate correction factors from Table A1 to the transformer factor found in Table A.

A- Three Phase Transformer Factors

TRANSFORMER		FACTOR 3 PHASE VOLTAGE			
KVA	**%Z**	**208**	**240**	**480**	**600**
75	1.60	9.00	10.00	20.00	24.00
100	1.70	7.00	8.00	16.00	20.00
112.5	2.00	7.40	8.50	17.00	21.00
150	2.00	5.40	6.00	12.00	15.00
225	2.00	3.70	4.00	8.00	10.00
300	2.00	2.70	3.00	6.00	7.50
500	2.50	2.15	2.25	4.50	5.60
750	5.75	2.78	3.25	6.50	8.00
1000	5.75	2.24	2.40	4.80	6.00
1500	5.75	1.48	1.60	3.20	4.00
2000	5.75	NA	1.20	2.40	3.00
2500	5.75	NA	.95	1.91	2.40

Notes: 208 volt 3ϕ transformer factors are calculated for 50% motor load. 240, 480 and 600 volt 3ϕ transformer factors are calculated for 100% motor load. A phase-to-phase fault is .866 times the calculated 3-phase value.

A1- Transformer Correction Factors

PRIMARY MVA	FACTOR 3 PHASE VOLTAGE			
	208	**240**	**480**	**600**
15	2.82	3.24	6.43	8.05
25	1.65	1.90	3.78	4.73
50	.78	.90	1.74	2.24
100	.34	.40	.80	1.00
150	.20	.23	.46	.58
250	.08	.10	.20	.25
Infinite	-.08	-.10	-.20	-.25

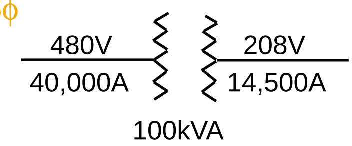
A2- Factor for Second Three Phase Transformer in System

1. Determine system factor at the second transformer primary.
Example: Isc @ 480V = 40,000A. Factor is 3.00 (from Scale 1).

2. Adjust factor in proportion to voltage ratio of second transformer.
Example: For 208V, factor changes to (208 480) x 3.00 = 1.30

3. Add factor for second 3ϕ transformer.
Example: Factor for 100KVA, 208V, 1.70%Z transformer is 7.00.
Total Factor = 7.00 + 1.30 = 8.30
(Isc = 14,500A)

3ϕ to 3ϕ



QUICK THREE PHASE SHORT CIRCUIT CALCULATIONS (Continued)

A3- Factors for Single Phase Transformer in Three Phase System

Transformer connections must be known before factor can be determined. See Figures A and B.

1. Determine system factor at 1ϕ transformer primary, with 480V pri., 120/240V sec. (Figure A)
Example: Isc @480V = 40,000, 3ϕ. Factor is 3.00 (from Scale 1).

$$1\phi \text{ factor} = \frac{3\phi \text{ factor}}{.866} = \frac{3.00}{.866} = 3.46$$

2. Adjust factor in proportion to voltage ratio of 480/240V transformer.
Example: For 240V, 1ϕ factor is (240 480) 3.46 = 1.73

3. Add factor for 1ϕ transformer with Figure A connection.
Example: Factor for 100KVA, 120/240V, 3%Z transformer is:
   a. 120V--total factor = 6.22 + 1.73 = 7.95
   (Isc = 15,000A)
   b. 240V--total factor = 8.64 + 1.73 = 10.37
   (Isc = 11,600A)

A3- Single Phase Transformer Factors

TRANSFORMER		FACTOR 1 PHASE VOLTAGE		
		120V	240V	120V
KVA	%Z	FIG. A	FIG. A	FIG. B
15	2.5	34.6	48.0	24.0
25	2.5	20.7	28.8	14.4
37.5	2.8	16.6	23.0	11.5
50	3.0	12.5	17.3	8.65
75	3.0	8.28	11.5	5.75
100	3.0	6.22	8.64	4.32
150	2.5	3.46	4.80	2.40
167	2.5	3.10	4.31	2.16
225	2.5	2.30	3.20	1.60
300	3.0	2.07	2.88	1.44
500	4.5	1.86	2.59	1.30

Note: Factor varies with %Z.
Example: 50KVA, 240V secondary with a 1.5%Z has a factor of (1.5%Z 3.0%Z) x 17.3 = 8.65

3ϕ to 1ϕ

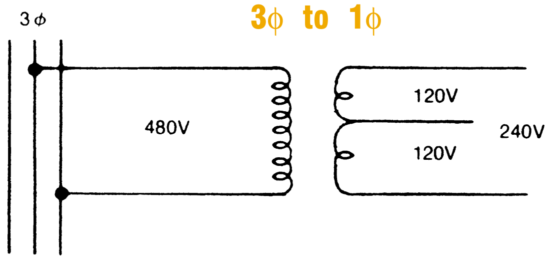


Fig. A

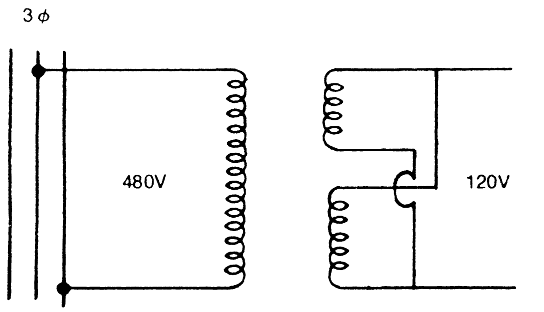


Fig. B

QUICK THREE PHASE SHORT CIRCUIT CALCULATIONS (Continued)

Component Factor Tables - Cables in Duct

B/B1- Copper Cables in Duct (Per 100')

CABLE SIZE	B–MAGNETIC DUCT				B1–NON-MAGNETIC DUCT			
	3 PHASE VOLTAGE				3 PHASE VOLTAGE			
	208	240	480	600	208	240	480	600
#8	79.00	68.00	34.00	27.00	78.00	67.60	33.80	27.10
6	50.00	43.00	22.00	17.50	47.90	41.50	20.70	16.60
4	32.00	28.00	14.00	11.15	30.70	26.70	13.30	10.70
2	21.00	18.00	9.00	7.23	19.90	17.20	8.61	6.89
1	17.50	15.00	7.40	5.91	16.20	14.00	7.07	5.60
1/0	14.00	12.20	6.10	4.85	13.20	11.40	5.70	4.57
2/0	11.80	10.20	5.10	4.05	10.60	9.21	4.60	3.68
3/0	9.80	8.50	4.27	3.43	8.87	7.59	3.85	3.08
4/0	8.40	7.30	3.67	2.94	7.57	6.55	3.28	2.62
250MCM	7.70	6.70	3.37	2.70	6.86	5.95	2.97	2.38
300	7.00	6.10	3.04	2.44	5.75	4.98	2.49	1.98
350	6.60	5.70	2.85	2.28	5.36	4.64	2.32	1.86
400	6.20	5.40	2.70	2.16	5.09	4.41	2.20	1.75
500	5.80	5.00	2.49	2.00	4.66	4.04	2.02	1.62
600	5.50	4.80	2.40	1.91	4.29	3.72	1.86	1.49
750	5.20	4.50	2.26	1.80	4.05	3.51	1.76	1.41

C/C1- Aluminum Cables in Duct (Per 100')

CABLE SIZE	C–MAGNETIC DUCT				C1–NON-MAGNETIC DUCT			
	3 PHASE VOLTAGE				3 PHASE VOLTAGE			
	208	240	480	600	208	240	480	600
#8	129.00	112.00	56.00	45.00	129.75	112.45	56.20	45.00
6	83.00	72.00	36.00	29.00	80.00	69.10	34.60	27.70
4	53.00	46.00	23.00	18.50	51.10	44.20	22.10	17.70
2	35.00	30.00	15.00	12.00	33.00	25.70	14.30	11.40
1	28.00	24.00	12.00	9.50	26.30	22.80	11.40	9.12
1/0	21.50	18.50	9.70	7.70	21.20	18.40	9.20	7.36
2/0	18.50	16.00	8.00	6.40	17.00	14.70	7.34	5.87
3/0	15.00	13.00	6.50	5.20	13.80	12.00	6.02	4.79
4/0	12.50	11.00	5.50	4.40	11.50	9.95	4.98	3.99
250MCM	11.10	9.60	4.80	3.85	10.10	8.72	4.36	3.49
300	9.90	8.60	4.30	3.42	8.13	7.04	3.52	2.81
350	8.60	7.40	3.70	3.00	7.49	6.50	3.07	2.45
400	8.30	7.20	3.60	2.90	6.87	5.95	2.98	2.38
500	7.40	6.40	3.20	2.60	6.12	5.31	2.66	2.13
600	7.20	6.20	3.10	2.44	5.30	4.59	2.29	1.83
750	6.50	5.60	2.80	2.22	4.85	4.20	2.10	1.69

Note: For parallel runs divide factor by number of conductors per phase.
Example: If factor for a single 500MCM conductor is 2.49 then the factor for a run having 3-500MCM per phase is 2.49   3 = .83 (Example from Table B, 480 volts)

QUICK THREE PHASE SHORT CIRCUIT CALCULATIONS (Continued)

$$I_{SC} = \frac{120{,}000}{\text{Total Factor}}$$

Component Factor Tables - Bus Duct

D- Factors for Feeder* Bus Duct (Per 100')

DUCT AMPERE RATING	FACTOR 3 PHASE VOLTAGE COPPER 208	240	480	600	ALUMINUM 208	240	480	600
600	2.85	2.48	1.24	.99	2.54	2.19	1.10	.88
800	1.61	1.40	.70	.56	2.54	2.19	1.10	.88
1000	1.61	1.40	.70	.56	1.90	1.65	.82	.66
1200	1.21	1.06	.53	.42	1.60	1.36	.66	.54
1350	1.17	1.01	.51	.40	1.32	1.14	.57	.46
1600	1.03	.89	.45	.36	1.19	1.03	.52	.41
2000	.90	.78	.39	.31	.90	.77	.39	.31
2500	.63	.54	.27	.22	.70	.60	.30	.24
3000	.51	.44	.22	.18	.60	.52	.26	.21
4000	.37	.32	.16	.13	.43	.38	.19	.15
5000	.30	.26	.13	.10	--	--	--	--

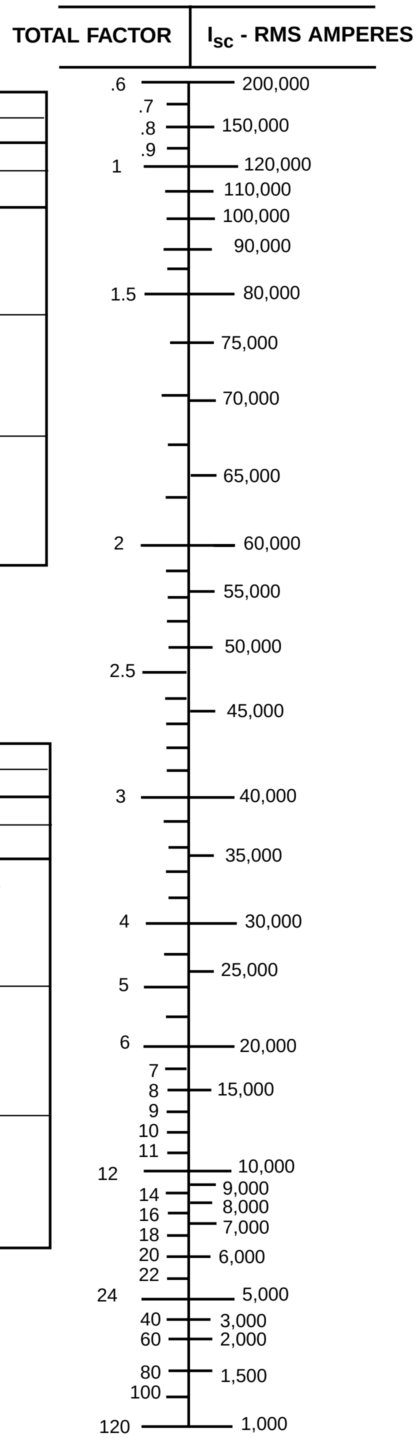
* These factors may be used with feeder duct manufactured by I-T-E, GE, Square D and Westinghouse.

D1- Factors for Plug-In** Bus Duct (Per 100')

DUCT AMPERE RATING	FACTOR 3 PHASE VOLTAGE COPPER 208	240	480	600	ALUMINUM 208	240	480	600
400	2.53	2.18	1.09	.89	3.88	3.34	1.67	1.36
600	2.53	2.18	1.09	.89	2.41	2.07	1.04	.84
800	1.87	1.61	.81	.66	2.41	2.07	1.04	.84
1000	1.87	1.61	.81	.66	1.69	1.45	.73	.59
1200	1.47	1.26	.63	.51	1.43	1.22	.61	.50
1350	1.26	1.08	.54	.44	1.30	1.12	.56	.45
1600	.91	.78	.39	.32	1.09	.94	.47	.38
2000	.79	.68	.34	.28	.89	.77	.38	.31
2500	.61	.52	.26	.21	.66	.57	.28	.23
3000	.48	.42	.21	.17	.59	.51	.25	.21
4000	.43	.37	.18	.15	.46	.40	.20	.16
5000	.38	.33	.16	.13	.35	.30	.15	.12

** These factors may be used with plug-in duct manufactured by GE, Square D and Westinghouse.

SHORT CIRCUIT CURRENT



SCALE 1

PROPERTIES OF MATERIALS

FUSE BLOCKS, FUSE HOLDERS, POWER DISTRIBUTION BLOCKS, FUSES & ACCESSORIES

PROPERTY	UNITS	ASTM TEST	PHENOLIC	POLYCARBONATE	POLYAMIDE	POLYBUTYLENE TERPHTHALATE	POLYSULFONE COPOLYMER	POLYPHTALAMIDE
Specific Gravity	-	D792	1.4	1.21	1.36	1.6	1.52	1.71
IZOD	ft-lb/in	D256	0.29	4-6	3.2	1.2	1.8	1.5
Flexural Strength	psi	D790	11,000	13,200	38,000	27,000	26,900	37,300
Flexural Modulus	psi	D790	1.1×10^6	325,000	1.25×10^6	1.1×10^6	1.4×10^6	1.9×10^6
Tensile Strength	psi	D638	7,000	9,000	25,000	17,000	17,600	26,000
Compressive Strength	psi	D695	28,800	12,500	34,000	18,000	-	-
Water Absorption	24 hrs %	D570	0.45	0.15	1.3	0.06	0.1	0.18
Hardness	Rockwell	D785	M-110	M-85	R-105	R-119	-	-
Dielectric Strength								
60 hertz, 25ºC, s/t	vpm	-	300	425	435	460	500	460
60 hertz, 25ºC, s/s	vpm	-	250	425	-	460	-	-
Dielectric Constant								
60 hertz–dry	-	D150	5.96	3.01	-	-	-	-
1 Mhertz–dry	-	D150	4.9	2.96	3.6	3.7	3.8	4.9
Volume Resistivity	ohm-cm	D257	50×10^6	$>10^{16}$	10^{16}	$>3.4 \times 10^{16}$	$>10^{16}$	3×10^{16}
Heat Deflection (ºF @ 264 psi)	ºF	D648	320	270	410	400	330	523
Flammability (UL 94)	-	-	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0
Relative Thermal Index (RTI) (UL746B)								
Electrical	ºC	-	150	125	150	130	150	140
Mechanical without impact	ºC	-	150	125	140	140	150	130

Note: Above data represents approximate values and are for reference only.

Application Information

Comparative Data of Stranded Copper and Aluminum Cables

SIZE AWG kcMil	AREA Circular Mils	Square Millimeters
30	100.5	0.051
28	159.8	0.081
26	254.1	0.123
24	404.0	0.205
22	642.4	0.326
20	1022	0.518
18	1620	0.823
16	2580	1.31
14	4110	2.08
12	6530	3.31
10	10380	5.26
8	16510	8.37
6	26240	13.3
4	41740	21.2
3	52620	26.7
2	66360	33.6
1	83690	42.4
1/0	105600	53.5
2/0	133100	67.4
3/0	167800	85.0
4/0	211600	107
250	-	127
300	-	152
350	-	177
400	-	203
500	-	253
600	-	304
700	-	355
750	-	380
800	-	405
900	-	456
1000	-	507
1250	-	634
1500	-	760
1750	-	887
2000	-	1014

Recommended Tightening Torque for Bolt-On and Stud Mounted Fuses

English Sizes

THREAD SIZE	TIGHTENING TORQUE ft.-lbs	in-lbs
1/4-20	4	50
5/16-80	7.5	90
3/8-16	13	160
3/8-24	15	180
1/2-13	30	360
1/2-20	31	375

Metric Sizes

THREAD SIZE	TIGHTENING TORQUE newton-meters	in-lbs
M6	6	53
M8	13	115
M10	26	230
M12	45	398

Small Ampere Rating Equivalents

FRACTION	DECIMAL	MILLIAMPS
1/64	0.0156	1.5
1/32	0.03125	3.1
1/16	0.0625	62.5
1/10	0.1000	100
1/8	0.1250	125
15/100	0.1500	150
175/1000	0.1750	175
3/16	0.1875	188
2/10	0.2000	200
1/4	0.2500	250
3/10	0.3000	300
315/1000	0.3150	315
3/8	0.3750	375
4/10	0.4000	400
1/2	0.5000	500
6/10	0.6000	600
630/1000	0.6300	630
7/10	0.7000	700
3/4	0.7500	750
8/10	0.8000	800
9/10	0.9000	900
1	1.000	1000

RULES FOR EQUIPMENT SHORT CIRCUIT RATING

The National Electric Code (1999) states:

110-9. Interrupting Rating
"Equipment intended to interrupt current at fault levels shall have an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment. Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that must be interrupted."

Enclosed fusible switches whether for individual wall mounting or in equipment assemblies, are "equipment intended to interrupt current". With this in mind, both the switch and the fuse must be adequately rated to satisfy code requirements.

The fuse must have an interrupting rating greater than the short circuit current available at the line terminals of the switch. The switch must have a short circuit current withstand rating greater than the short circuit current available at the line terminals of the switch.

UL98 "Enclosed and Dead-Front Switches" requires that Listed switches be tested with fuses to establish the short circuit current withstand rating of the switch. The switch is then required to be marked with its withstand rating, the appropriate UL fuse class and maximum circuit voltage.

FERRAZ SHAWMUT INSTRUCTIONAL VIDEOS

Misapplication (8 minutes)
An early film which dramatically shows the hazards of substituting the wrong fuse at an industrial plant.

Circuit Protection For The Future, Today (9 minutes)
Shows a comparison of fuses and circuit breakers protecting electrical equipment found in typical industrial plants.

AJT/IEC Contractor Protection (10 minutes)
Demonstrates the difference between the protection requirements of North American and European motor control components.

A-T 2000 (12 minutes)
Shows the importance of high current limitation and introduces the concept of "No Damage" protection.

10 REASONS FOR USING CURRENT-LIMITING FUSES

- **RELIABILITY**
No moving parts to wear or become contaminated by dust, oil or corrosion.

- **LONG LIFE**
The speed of response of a fuse will not change or slow down as the fuse ages. In other words, the fuse's ability to provide protection is not adversely affected by the passage of time.

- **MINIMAL MAINTENANCE**
Fuses do not require periodic recalibration as do electro mechanical overcurrent protective devices.

- **COMPONENT PROTECTION**
The current limiting action of a fuse minimizes or eliminates component damage.

- **NORTH AMERICAN STANDARDS**
Tri-national Standards specify fuse performance and maximum allowable fuse Ip and I^2t let-thru values.

- **SELECTIVITY**
Fuses may be easily coordinated to provide selectivity under both overload and short circuit conditions.

- **HIGH INTERRUPTING RATING**
You don't pay a premium for high interrupting capacity. Most low voltage current limiting fuses have a 200,000 ampere interrupting rating.

- **COST EFFECTIVE**
Fuses are generally the most cost effective means of providing overcurrent protection. This is especially true where high fault currents exist or where small components need protection.

- **EXTENDED PROTECTION**
Devices with low interrupting ratings are often rendered obsolete by service upgrades or increases in available fault current. Non-fused systems may need expensive system upgrades to maintain system safety.

- **SAFETY**
Overcurrent protective devices which operate are often reset without first investigating to find the cause of opening. Electro-mechanical devices which have opened high level faults may not have the reserve capacity to open a 2nd or 3rd fault safely. When a fuse opens it is replaced with a new fuse, thus protection is not degraded by previous faults.

AMP-TRAP 2000

SUGGESTED FUSE SPECIFICATIONS

1.0 General
The electrical contractor shall furnish and install a complete set of fuses for all fusible equipment on the job as specified by the electrical drawings. Final tests and inspections shall be made prior to energizing the equipment. This shall include tightening all electrical connections and inspecting all ground conductors. Fuses shall be as follows:

2.0 Mains, Feeders and Branch Circuits

A. Circuits 601 to 6000 amperes shall be protected by current-limiting Ferraz Shawmut Amp-Trap 2000 Class L time-delay **A4BQ** fuses. Fuses shall be time-delay and shall hold 500% of rated current for a minimum of 4 seconds, clear 20 times rated current in .01 second or less and be UL Listed and CSA Certified with an interrupting rating of 200,000 amperes rms symmetrical.

B. Circuits 600 amperes or less shall be protected by current-limiting Ferraz Shawmut Amp-Trap 2000 Class RK1 time-delay **A2D** (250V) or **A6D** (600V) or Class J time-delay **AJT** fuses. Fuses shall hold 500% of rated current for a minimum of 10 seconds (30A, 250V Class RK1 case size shall be a minimum of 8 seconds) and shall be UL Listed and CSA Certified with an interrupting rating of 200,000 amperes rms symmetrical.

C. Motor Protection
All individual motor circuits shall be protected by Ferraz Shawmut Amp-Trap 2000 Class RK1, Class J or Class L time-delay fuses as follows:

Circuits up to 480A: Class RK1 - **A2D** (250V) or **A6D**(600V)
Class J - **AJT**

Circuits over 480A: Class L - **A4BQ**

Fuse sizes for motor protection shall be chosen from tables published by Ferraz Shawmut for the appropriate fuse. Heavy load and maximum fuse ratings are also shown for applications where typical ratings are not sufficient for the starting current of the motor.

D. Motor Controllers
Motor controllers shall be protected from short circuits by Ferraz Shawmut Amp-Trap 2000 time-delay fuses. For Type 2 protection of motor controllers, fuses shall be chosen in accordance with motor control manufacturers' published recommendations, based on Type 2 test results. The fuses shall be Class **RK1** A2D (250V) or **A6D** (600V) or Class J **AJT** or Class CC **ATDR** (600V).

E. Circuit breakers and circuit breaker panels shall be protected by Ferraz Shawmut Amp-Trap 2000 fuses Class RK1 (**A2D** or **A6D**), Class J (**AJT**) or Class L (**A4BQ**) chosen in accordance with tested UL Series-connected combinations published in the current yellow UL Recognized Component Directory.

F. Lighting and control circuits in the connected combinations shown up to 600VAC shall be protected by Ferraz Shawmut Amp-Trap 2000 Class CC time-delay **ATQR** or **ATDR** fuses, sized according to the electrical drawings.

3.0 Spares
Spare fuses amounting to 10% (minimum three) of each type and rating shall be supplied by the electrical contractor. These shall be turned over to the owner upon project completion. Fuses shall be contained and cataloged within the appropriate number of spare fuse cabinets (no less than one). Spare fuse cabinets shall be equipped with a key lock handle, be dedicated for storage of spare fuses and shall be **GSFC**, as supplied by Ferraz Shawmut.

4.0 Execution
A. Fuses shall not be installed until equipment is to be energized. All fuses shall be of the same manufacturer to assure selective coordination.

B. As-installed drawings shall be submitted to the engineer after completion of the job.

C. All fusible equipment rated 600 amperes or less shall be equipped with fuse clips to accept Class RK1 or Class J fuses as noted in the specifications.

5.0 Substitution
Fuse sizes indicated on drawings are based on Ferraz Shawmut Amp-Trap 2000 fuse current-limiting performance and selectivity ratios. Alternative submittals to furnish materials other than those specified, shall be submitted to the engineer in writing two weeks prior to bid date, along with a short circuit and selective coordination study.

GENERAL PURPOSE IEC FUSES

WIDE RANGE FOR GENERAL PURPOSE IN INDUSTRY.
U_N FROM 250 TO 690 V~
I_N FROM 0.25 TO 1,250 A

3 TECHNOLOGIES
- FERRULE STYLE WITH OR WITHOUT TRIP-INDICATOR
- BLADE STYLE WITH BLOWN FUSE INDICATOR OR TRIP-INDICATOR
- DIN STYLE DIAZED AND NEOZED

WIDE RANGE OF FUSEGEAR :
FUSE HOLDERS, CLIPS, FUSE-DISCONNECTORS, FUSESWITCHES, SWITCH FUSES.

COMPLYING WITH STANDARDS :
IEC 269 1-2 AND 2-1, EN 60269-1, NFC 63210 AND 211
FOR SOME MODELS : VDE 0636 / DIN 57636.



Fuses give you technical profit and cost-saving to protect industrial equipment. A very high interrupting rating and a well-known reliability are their main features. Fuse remains a key element for electrical protection.
Two technologies are available depending on the level of the operating currents. Up to 125 A ferrule style fuses are concerned, higher up to 1,250 A it is the field of the blade style fuses. D-DO technology are specialy designed for rejection systems.

MAIN APPLICATIONS

• Protection of distribution circuits
gL-gG-class fuses are capable of clearing any type of overloads. They are adaptated to protect distribution cables and circuit components. They are capable of clearing from overcurrents close to their rating up to a short - circuit current equal to their very high interrupting rating (100 to 200 kA).

• Protection of motors
The aM-class fuses are dedicated to protect electrical motors. They can't clear low overloads and therefore must be connected in serie with a relay. They are capable of withstanding motors startings conditions.
With a very high interrupting rating they achieve a perfect protection against short-circuits.

FERRAZ SHAWMUT markets three styles of general purpose fuses.

• Ferrule style fuses
for mounting in clips, fuse-holders, fuse-disconnectors or in switch-disconnectors with fuses.
Blown fuse indication and/or remote sensing with the related microswitch of the fusegear can be achieved with the models with trip-indicator.

• Blade style fuses
for mounting in fuse-holders or in switch-disconnectors with fuses. They are available with a blown fuse indicator or with a trip-indicator enabling the blown fuse indication and a remote sensing with the microswitch of the fuse-gear.

• D - DO style fuses
for mounting in fuse base, fuse-disconnector and switch-fuse-disconnector.

GENERAL PURPOSE IEC FUSES

The curves are plotted according to IEC 269-1 and 2 i.e. calm air and temperature between 20 and 25°C. The main characteristics are indicated in the related data sheets. They include besides the voltage rating :
- the style of the time vs. current time
- the size
- the current rating
- the power losses
- the interrupting rating
- the time vs. current characteristic which means : the pre-arcing time as a function of the R.M.S. available current.

For pre-arcing times higher than 10 ms, the virtual and real pre-arcing time values are identical.

The environment has to be taken into account. Especially when the temperature is higher than 40°C a derating factor must be applied.

$$A1 = \frac{120 - \theta}{80}$$

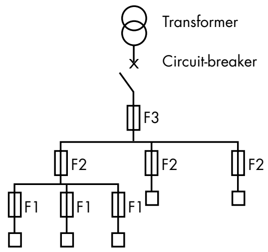
θ = ambiant temperature in °C

Selective coordination

When fuses are used for protecting an electrical installation, a selective coordination has to be achieved among them.
I.e. that downstream F1 fuse must clear without F2 and F3 being damaged.

Practically the coordination will be achieved each time the F1 total I2t is lower than the F2 pre-arcing I2t.
Using the characteristics that we publish eases the inspection.

The gG-class fuses enable a more precise coordination among fuses with current rating higher than 16 A, thanks to the 1.6 selective coordination factor (instead of 2 for gl-class). It means that a 100 A gG-class fuse located at F1 is selective with a 160 A gl-class fuse located at F2



PROTECTION OF MOTORS

The hereunder table gives the current rating and the size of fuses (gl-class or aM-class + relay) for mean starting conditions i.e. 1 or 2 startings per day at 6 In (2s)

When the startings number per day reaches 5, it is advised to select a rating just above the one given in the table

When the motor speed is 3,000 rpm, the rating to be selected is the one of the table multiplied by a corrective factor between 0.8 and 0.95. When the speed is 750 rpm, the factor to be taken into account is between 1.1 and 1.4.

3-phase motors 1,500 rpm									Voltage rating range, current ratings and fuses classes																			
220 V			380 V			600 V to 690 V			380 V		250 V to 500 V		400 V to 690 V		400 V to 690 V		400 V to 500 V		500 V to 690 V								440 V to 660 V	
									8 x 32		10 x 38		14 x 51		22 x 58		T 00		T 0		T 1		T 2		T 3		T 4	
kW	Ch	I_N (A)	kW	Ch	I_N (A)	kW	Ch	I_N (A)	gl	aM	gl	aM	gl	aM	gl	aM	gl	aM	gl	aM	gl	aM	gl	aM	gl	aM	gl	aM
						0,10	0,14	0,18					0,25		0,25													
0,05	0,068	0,39	0,10	0,135	0,30	0,20	0,27	0,35			1		1	0,5	1	0,5												
0,10	0,135	0,53	0,18	0,25	0,55	0,37	0,50	0,60	2	1	2	1	2	1	2	1												
0,18	0,25	0,94	0,37	0,5	1,1	0,55	0,75	1	4	2	4	2	4	2	42													
			0,55	0,75	1,6	1,1	1,5	1,5	4	2	4	2	4	2	4	2												
0,37	0,5	1,9	0,75	1	2	1,5	2	2	6	4	6	4	6	4	6	4												
0,55	0,75	2,8	1,1	1,5	2,6	2,2	3	2,9	8	4	8	4	8	4	8	4												
0,75	1	3,5	1,5	2	3,5	2,8	3,8	3,5	10	4	10	4	10	4	10	4												
1,1	1,5	4,4	2,2	3	5	4	4,5	4,8	12	6	12	6	12	6	12	6												
1,5	2	6	3	4	6,6	5	7,5	6,6	16	8	16	8	16	8	16	8	16											
2,2	3	8,7	4	5,5	8,5	7,5	10	8,8	20	10	20	10	20	10	20	10	20											
3	4	11,5	5,5	7,5	11,5	10	13,5	11,5			25	12	25	12	25	12	25	25										
4	5,5	14,5	7,5	10	15,5						32	16	32	16	32	16	32	16	32									
						15	20	17				20	40	20	40	20	40	20	40									
5,5	7,5	20	10	13,5	20	18,5	25	21				25	50	25	50	25	50	25	50	25	50							
7,5	10	27	15	20	30	26	35	29							50	32	50	32	50	32	50							
10	18,5	35	18,5	25	37	30	40	34							63	40	63	40	63	40	63							
11	15	39	22	30	44	37	50	41							80	50	80	50	80	50	80	50						
15	20	52	25	34	51	50	68	55							100	63	100	63	100	63	100	63						
18,5	25	64	30	40	60	55	75	60							125	80	125	80	125	80	125	80	125					
22	30	75	37	50	73										125	80	125	80	125	80	125	80	125					
25	34	85	45	60	85	75	100	78								100	160	100	160	100	160	100	160					
30	40	103	55	75	105	90	125	96								125		125		125	200	125	200	125				
45	60	147	75	100	138	132	175	140												160	250	160	250	160				
55	75	182	90	125	170	160	220	175														200	315	200	315			
75	100	239	110	150	205	220	300	236														250	400	250	400			
			132	175	245	250	350	271														315		315	500	315	500	
90	125	295	160	220	300	275	375	300														315		315	500	315	500	
110	150	356	200	270	370	330	450	350																400	630	400	630	
132	175	425	250	350	475	400	550	430																500		500	800	500
160	220	520	300	400	560	550	750	577																		630	1000	630
220	300	705	400	550	750	736	1000	778																			1250	800
300	400	970	500	700	950																							1000
365	500	1150	600	800	1090																							1250

PROTECTION OF DISTRIBUTION CIRCUITS

The IEC 364 (NFC 15100 french) standards give the rules to be applied for selecting the wires gauge and the protection. Selecting a fuse rating must always be made after
1/ determining the permissible currents through cables,
2/ determining the number of joined cables according to the way of fixing.
When the rules of installation are respected a gl-class fuse with a rating just above the operating current must be selected. When ambiant temperature is 30°C, the minimum cross section of the phase and neutral wires has to be selected according to the hereunder table.

Maximum operating current and ratings of gl-class fuses	Minimum section of copper wires (mm²)			Maximum operating current and ratings of gG-class fuses	Minimum section of copper wires (mm²)		
	phase	neutral	PEN (1)		phase	neutral	PEN (1)
12	1,5	1,5	1,5				
16	2,5	2,5	2,5				
20	4	4	4				
32	6	6	6	32	10	10	10
40	10	1Q	10	40	16	t6	16
63	16	16	16	63	25	25	25
				63	35	35	35
80	25	25	25	80	50	35	35
100	35	25 (2)	25	100	70	35 (2)	35
125	50	25 (2)	25	125	95	50 (2)	50
160	70	35 (2)	35	160	120	70 (2)	70
160	95	50 (2)	50	160	150	70 (2)	70
200	120	70 (2)	70	200	185	70 (2)	70
250	150	70 (2)	70	250	240	95 (2)	95
250	185	70 (2)	70				
315	240	95 (2)	95	315	2x120	120 (2)	120
				315	2x120	150 (2)	150
400	2x120	120 (2)	120	400	2x185	150 (2)	150
500	2x150	150 (2)	150	500	3x120	185 (2)	185
500	2x185	150 (2)	150	500	3x150	185 (2)	185
630	3x120	185 (2)	185	630	3x185	240 (2)	240
630	3x150	185 (2)	185				
800	3x185	240 (2)	240	800	3x240	240 (2)	240

(1) PEN wires : wire achieving neutral wire and protection wire at the same time.
(2) In 3-phase circuit when 90% of the total power is supplied between phases and when the currents are roughly matched, the cross section of neutral wires can be lower than the one of phase wires.

The fuses have to be mounted at the origin of the circuits to be protected.
When sections are higher than 240 mm2, non insulated wires or one-phase wire must be used.

AC SEMICONDUCTORS PROTISTOR® FUSES

GENERAL

Introduction conformity to standards
Laying out of electrical characteristics
Use of electrical characteristics
Determination of the rated current IN of a PROTISTOR
Use of PROTISTORS at frequencies below 45 Hz and above 62 Hz
Use of PROTISTORS on pure DC current

1 - INTRODUCTION

Ferraz Shawmut PROTISTOR fuses for the protection of power semiconductors are particularly well adapted to the present needs of the market because of their performance and the amount of published electrical data.
Their presentation conforms to IEC 269-4 and DIN 57636 (VDE 0636) part 23.
This PSC range concretises the permanent research of FERRAZ SHAWMUT to go on improving its PROTISTOR if is mainly characterized by :
- Improved performances
- Reduction in volume and weight
- Improved availability of our multistandard connections.

Three technologies :
- End contact types which allow compact assembly and can be directly fastened to bus bars
- FERRAZ and GERMAN standards blade types (80-110 mm center to center, in accordance with DIN 43653 standard), which can be mounted info bases or directly on bars and AMERICAN standard without base.
- Press-Pack types size 3, single and double body, enabling a direct clamping with the semi-conductors.

All the types are equipped with a patented highly reliable low voltage trip-indicator, which does not require the use of an EDV adaptor.
This 4 mm stroke trip-indicator can operate a microswitch directly screwed onto the fuse.
The working voltage of the low voltage trip-indicator is 1.5 V. In practice, the time required to fully operate our microswitches is 5 ms, counted from the end of PROTISTOR prearcing time.
For each type, two kinds of protection are available :
- standard protection for indoor use or under cover use in temperate climates, also suitable in tropical and equatorial areas in rooms normally ventilated, under the folowing condition :

(The climate is not the sole criterion for material

Maximum temperature °C	20	40	50
Maximum relative humidity %	95	80	50

selection, only the surrounding air is the determining factor).
- salt laden atmosphere protection, (our BS protection), to be applied in case of direct exposure to :
- seaside weather
- wet tropical climate
- corrosive industrial atmosphere (for very corrosive surroundings, consult us).

Conformity of these PROTISTORS to standards :

Testing according to IEC 269- 1 and 4

Equivalent standards exist in most countries :
- NFC 60200/C 63220 BS88-1 and 4
- DIN 57636 (VDE 0636) parts 1 and 23
(gR and aR operation)

Dimensions :
DIN 43653 for blade models (80-110-130 mm center to center.)

2 - LAY OUT OF THE ELECTRICAL CHARACTERISTICS

They are plotted according to IEC 269-1 and 269-4
(the conductors being those of IEC 269-1) i.e. in AC 50 Hz calm air with temperature between 20 and 25O°C.
The interrupting tests are done under the rated voltage + 10%. The rated voltage of these fuses is between 150 and 1250 V according to IEC, and between 450-500 V and 1300 V according to US standards.

AC SEMICONDUCTORS PROTISTOR® FUSES

3 - USE OF THE ELECTRICAL CHARACTERISTICS

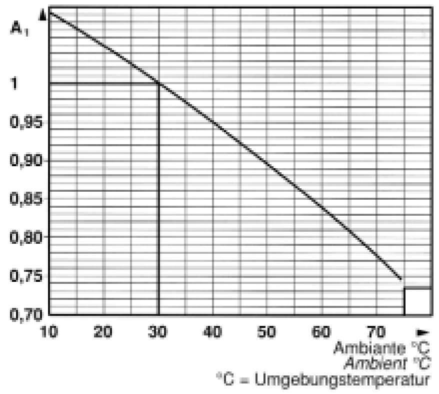
They are valid for frequencies between 45 and 62 Hz and for the shape of rectified current circulating in semiconductors at these frequencies. They are also valid for the case of P. W. M. converters with often very high commutating frequencies.
In fact, all the sizes of this PSC range have a non magnetic construction.
(see paragraph 5.2.).

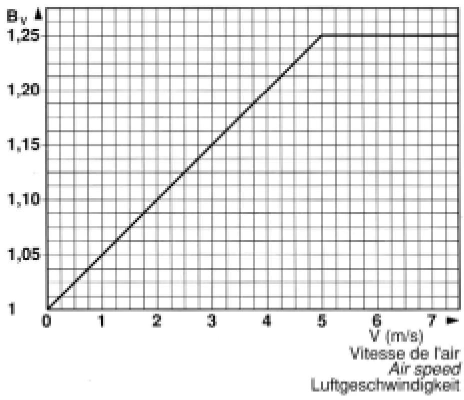
4- DETERMINATION OF THE RATED CURRENT I_N OF A PROTISTOR

This has to be done in accordance with the surroundings, the RMS current variation and the repetitive and/or unusual overloads the PROTISTOR has to withstand. The necessary corrective coefficients are published on the time/current characteristics.
a : for ambient > 30° C
B1: for an air flow with V < 5 m/s.
A2 : to prevent ageing when the RMS current varies a lot.
If the variation is smooth or if the off time (or small current duration) is short, a rated current I_N smaller than this calculated with A2 can be used.
B2: to prevent ageing in case of repetitive overloads.
Cf3: to prevent the fuse from damaging in case of unusual overloads.
In order to take into account the connecting conditions of fhe user (thermally often not as good as those recommended by the standards) an extra empinca/ coefficient Cl may be used, with a value between 0.85 and 0.95.
In fact, only a practical test can determine whether the rated current of the PROTISTOR is sufficient or not for its surrounding and its actual connecting conditions
(see technical buttetin T 70).
The use of these corrective coefficients is described in our technical bulletin T 59
However, we have fett the necessity to provide the two following curves respectively corresponding to the ambient and air flow influence on the maximum continuous permissible current through a PROTISTOR rated I_N, connected as per the prescription of IEC 269.
The combined influence of an ambient > 30℃ and an air flow is obtained by multiplying the fwo coefficients (A 1 x Bv).

Remark :
When semiconductors are liquid cooled, it may be profitable to use it for PROTISTOR terminals.
It brings a larger maximum continuous permissible current. Consult us.

The value 1 corresponds to the rated current I_N

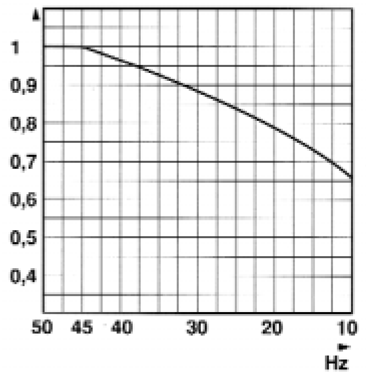




AC SEMICONDUCTORS PROTISTOR® FUSES

5 - USE OF PROTISTORS AT FREQUENCIES BELOW 45 Hz AND ABOVE 62 Hz

5.1. - Frequencies below 45 Hz
Maximum working voltage :
Given by the curve hereafter.



The value 1 corresponds to the rated current I_N

For frequencies below 1O Hz, one may consider that the fuse operates at a DC voltage equal to the peak value of the AC voltage of the circuit. See 'use of a PROTISTOR on DC" paragraph 6. This approach always gives a working voltage below the one the fuse can interrupt, since voltage goes through zero.
Maximum continuous permissible current.
It depends upon the surroundings and connecting conditions of the PROTISTOR (see paragraph 4).
Furthermore below 45 Hz, it can be said that the RMS current into the fuse is vanable, so a dera-ting coefficient may be necessary, mainly for the lowest frequen-cies.
Consult us.
Other characteristics.
Below 45 Hz, the published data is no longer valid except the time/current characteristics, the curve "dissipated power" and the temperature rise.
Determination of the rated current IN of PROTISTOR (see paragraph 4).

5.2. - Frequencies above 62 Hz.
Maximum working voltage :
No derating up to 1000 Hz.
Maximum continuous permissible current
No derating up to 1000 Hz, but it always depends on the surrounding and connecting conditions of the PROTISTOR (see paragraph 4).
Other characteristics :
Above 62 Hz, the published data is no /anger valid except the time/current characteristic.
Determination of the rated current INof a PROTIS-TOR (see paragraph 4).

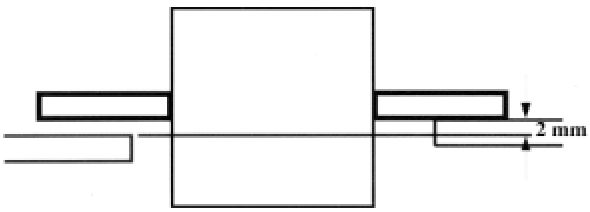
6 - USE OF A PROTISTOR ON DC

AC PROTISTORS can operate on pure DC providing two conditions are fulfilled :
a) at a given working voltage, the time constant L/R of the fault circuit must be equal or below a published value.
b) the prospective fault current must be larger than the indicated minimum breaking DC current.
Remark :
When the di,,dt of the fault current is very large, the above condition (a) can be
exceeded. This is the case of faults in voltage commutated inverters (see application bulfe-tin NT SC 120).
Determination of the rated current
PROTISTOR (see paragraph 4).

7 - MOUNTING PRECAUTION OF PROTISTORS

7.1. - End contact types

Screws can be used, however the best solution remains our studs which allow to fully
use the threads in terminals and to balance the recommended tightening torque.
The paraleling of end contact types has to be done by using “laminated” on one side because
of the tolerances of their length.
7.2. - Blade types
The fuse must not be used to balance tigh-tening torque.
The fastening of fuses between two bars can be done upon the condition that they are in
the same plane at less than 2 mn (see sketch).



7.3.- Press-Pack types

The Clamping force must be high enough to ensure a contact pressure 0.4 daN/ mm2 and musf be lower than 5000 daN in size 73 and 2 x 73 PPAF.

8- Marking of the rated voltage

PSC fuses show 2 marking types of their rated voltage :
- “Rated voltage”, according to IEC, in V RMS for all the fuses tested in compliance with IEC (test under rated voltage + 10 %)
- “Rated voltage”, according to American standards, in V RMS for all the fuses tested in compliance with US standards (test under the rated voltage)

Application Information

DC PROTISTOR® FUSES

THE MOST COMPREHENSIVE RANGE:
U_N from 48 to 4200 V DC
I_N from 0.8 to 1600 A

2 STYLES:
FERRULE
SQUARE BODY

FAST AND ULTRA-FAST ACTING FUSES
gR. AND aR. CLASSES

VERY HIGH INTERRUPTING RATING

WIDE RANGE OF ACCESSORIES



When fault circuits are inductive, with occurence of all types of prospective fault currents, interrupting of a pure DC can only be achieved thanks to dedicated fuses. These lines are specifically designed to protect semiconductors and DC circuits.

Main applications :

•**electric traction** : high and medium powers, traction auxiliaries ;
•**electric cars** : U 48V DC ;
•**converters** : voltage commutated inverters, frequency converters, DC choppers ;
•**telephony** : central office batteries circuits.

FERRAZ SHAWMUT markets two styles in this field :

•**ferrule** fuses to be mounted in clips, fuse-bases and disconnectors. A built-in "open" fuse trip-indicator, associated with a microswitch (mounted on the fuse or on the fuse-disconnector), is useful for indication and /or remote sensing (page 2).

•**square body** blade style, stud style or offset tag style fuses for mounting on fuse-bases, on bars or in boxes. These models are available with a built-in trip-indicator. Associated with an on-EDV-snap-mounted microswitch, the indicator enables to perform remote sensing (page 3).

DC PROTISTOR® FUSES

Conformity with standards
Testing according to IEC 269-1 and 4.
Similar standards exist in most countries :
NFC 60200-C63220, BS 88-1 and 4, DIN 57636 (VDE 0636) parts 1 and 23.

Electrical characteristics
The curves are plotted according to IEC 269-1 and 269-4 – i.e calm air with temperature between 20 and 25°c –. Interrupting tests are performed under rated voltage +10%.
A table shows for each fuses line the major characteristics besides **voltage rating** :
• **type** which characterizes time vs. current curve ;
• **case size** ;
• **current rating** ;
• **total clearing I2t** – values checked at specified voltage and L/R time constant – ;
Consult us to determine the total clearing I2t of your application. It's computed from maximum voltage (U), prospective current (U/R) and fault circuit time constant (L/R). It must be lower than the semiconductor I2t for the same duration.
• **dissipated power** @ 0.8 and one time rated current in thermal steady state ;
• DC **interrupting rating**.

Time vs. current characteristics
These curves indicate the pre-arcing time vs. the RMS pre-arcing current. They can be used for AC applications also.
There are two classes of operation:
gR class: fuses capable of clearing all overloads. these fuses have no minimum interrupting current.
aR class: fuses not capable of clearing all overloads.
(aR and SR time vs. current curves).
CC' curve indicates low overloads maximum clearing values for associated protecting device. Its end points out the minimum interrupting current of the fuse.

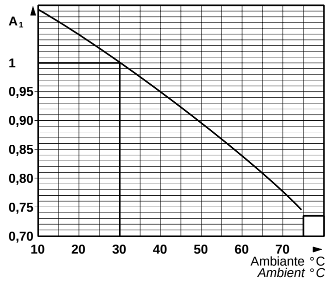
L/R vs. voltage curve
It indicates the maximum DC voltage which can be interrupted by the fuse vs. fault circuit time constant (L/R). For high prospective currents time constant should be higher than published values.Consult us.

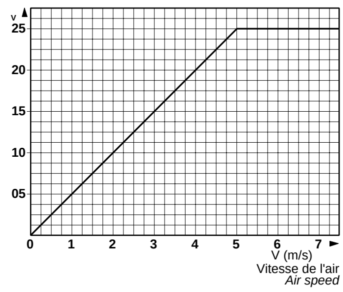
I2t corrective factor K curve
It indicates total clearing I2t multiplier corrective factor K vs. working voltage U. Multiplying total clearing I2t read in table by K gives the total I2t value at working voltages U different of the rated voltage.

Peak arc voltage curve
This curve indicates the peak arc voltage vs. working voltage at various time constants.

How to determine the PROTISTOR® rated current ?
Three criteria are significant :
• **environmental conditions** – ambient temperature , connections – ;
• **fluctuation of flowing RMS current** ;
• repetitive and unusual **overloads** ;
Necessary corrective coefficients , dealing with time vs. current characteristics, are published :

a : for ambient >30°c ;





B1 : for an air-forced cooling with an air speed lower than 5ms ;
A2 : to prevent ageing when RMS current varies a lot. If the variation is smooth or if the off-time is short, a current rating smaller than this computed with A2 can be used ;
B2 : to prevent ageing in case of repetitive overloads ;
Cf3 : to prevent fuse damage in case of unusual overloads.
In order to take into account the connecting conditions, usually worse than those recommended by standards, an extra rule-of-thumb corrective factor **C1** should be used. Its value is between 0.85 and 0.95. In fact, only a real test can determine whether PROTISTOR® rated current is high enough for its environmental conditions (consult technical guide T70). How to use all these coefficients is described in our technical guide T59.Yet, we provide the two curves above. They show ambient and air flow influences on maximum continuous permissible current through a PROTISTOR® connected in accordance with IEC 269-1.

How to use PROTISTOR® in AC circuits ?
DC PROTISTOR® can operate also in AC circuits, especially with low frequencies. See the use at 50/60 Hz and corresponding interrupting rating.

Use of AC PROTISTOR®s on DC for protection of voltage commutated inverters
AC fuses are able to operate with large di/dt faults currents (capacitor discharge) : extremely fast fault current interrupting and semiconductor protecting. Consult the use possibilities for voltage commutated inverters.

Circuit Protection Software

Now, the answers to your fuse specification, coordination, and analysis questions are right at your fingertips.



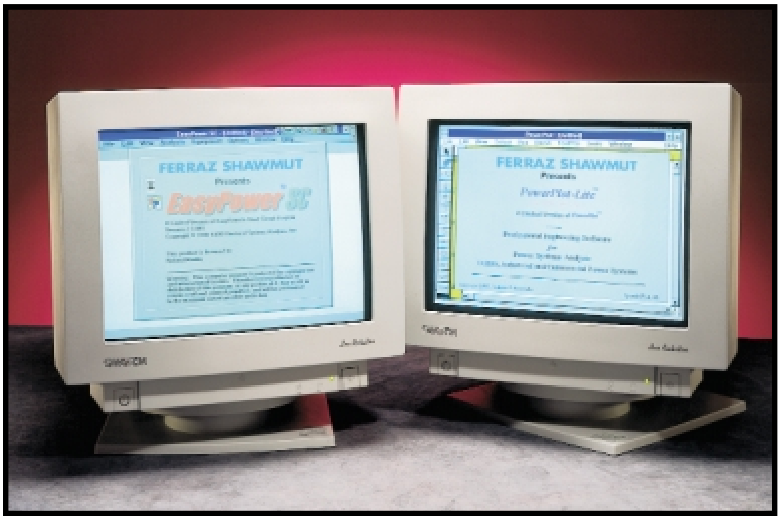
- **EasyPower® SC Short Circuit Calculation Program for Windows®**
- **PowerPlot™ LT Coordination Analysis for Windows®**
- **Select-A-Fuse®**

Your problem: Time is everything to a specifying engineer trying to get a new plant up and running on schedule. Or the design engineer trying to keep pace with today's compressed product development cycles. The last thing either needs is to spend hours searching through fuse catalogs, plotting melting curves, copying dimensional drawings, and making manual scenario calculations.

Our solution: Ferraz Shawmut's Circuit Protection Software puts you on the leading edge of technology — where electrical system protection is easier, faster, more accurate, and headache-free. Need the right fuse fast? Click into Select-A-Fuse® — the industry's best fuse selection software. Designing, upgrading, or evaluating a complex power system? Our EasyPower® SC Short Circuit Calculation Program for Windows® is a must have. We even have a PowerPlot™ LT Coordination Analysis for Windows ®, so you can quickly view time current curves at the click of a button.

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CIRCUIT PROTECTION SOFTWARE



EASYPOWER® SC SHORT CIRCUIT CALCULATION PROGRAM FOR WINDOWS®

A must-have for anyone who designs, tests, or evaluates electrical power systems! Our power-engineering software is fast, accurate, powerful, and easy to work with. The program allows you to design a true "one-line" graphic display on screen – eliminating tedious, error-prone data entry and condensing hours of analysis and changes into seconds. Features include a convenient Windows interface, dialogue boxes, file management, and numerous printing options; Integrated Action Graphics™ (IAG) for " snapping together" one-line drawings with a click of a mouse; a snap grid for quick one-line layouts; the world's first fully functional breaker, fuse, and switch model; and a dozen other time-saving interface extras. The program runs on Windows® 3.1 or higher.

POWERPLOT™ LT COORDINATION ANALYSIS FOR WINDOWS®

Our PowerPlot program is a completely object-oriented, graphical Power System Analysis tool for engineers conducting Protective Coordination Studies. The program enables you to quickly test multiple "what if" scenarios; just enter different items and values, then click on the "Plot" command for an instant on-screen representation. You can also check time clearances between relays or fuses, change the TCC scale, and add or reposition text notes and labels wherever you want them. Windows version of 3.1 or higher is required.

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The industry's best fuse specification software. Quickly, accurately choose the right overcurrent protection for low- and medium-voltage motors, power and control transformers, and general loads. Includes Melting Time and Peak Let-Thru curves, specs, dimensions, a comprehensive product cross-reference, and ability to check system coordination. Lets you save your search to a file and print.



Visit our **SolutionSite** at **http://www.ferrazshawmut.com**
e-mail address: info@ferrazshawmut.com

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